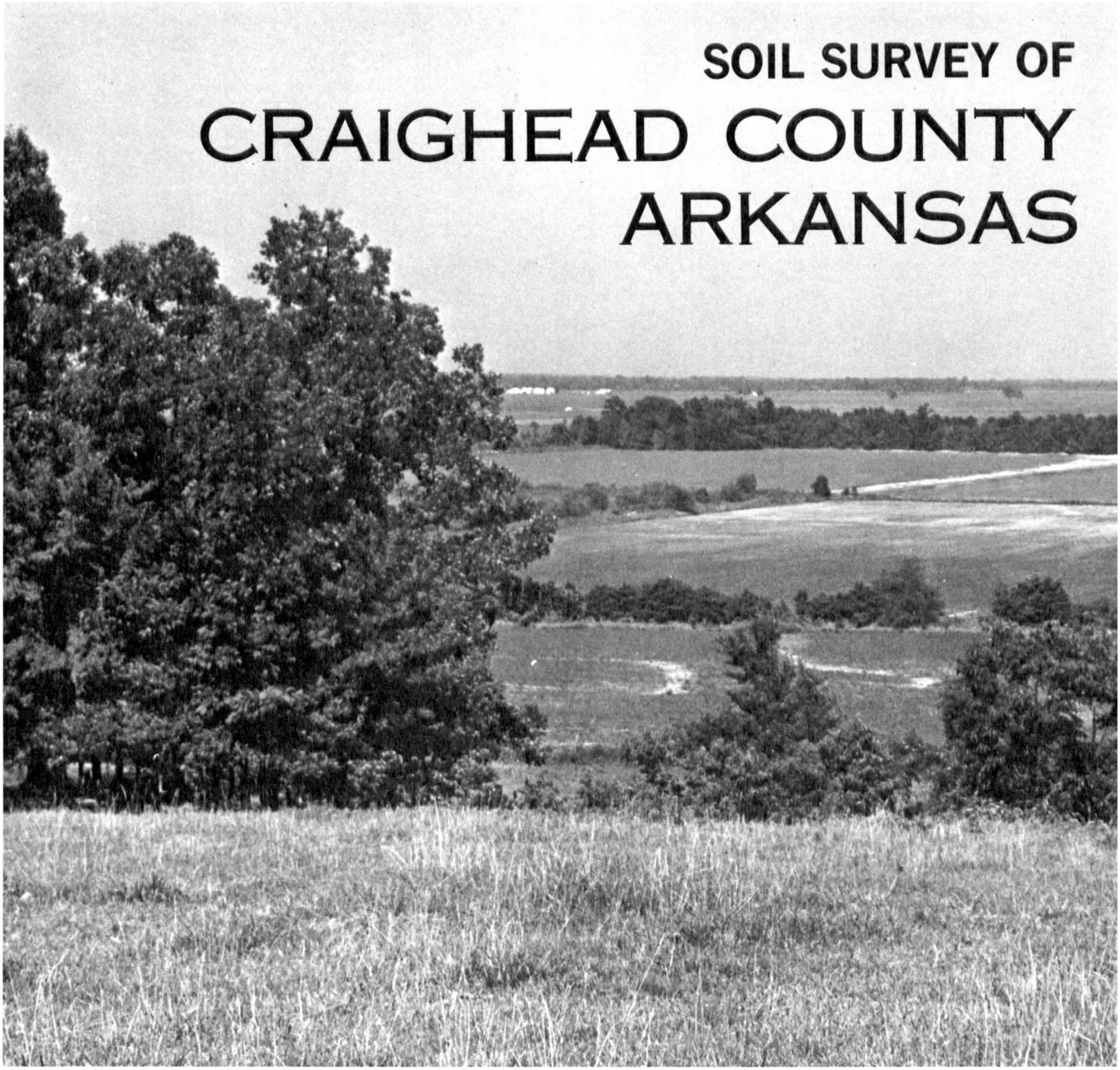
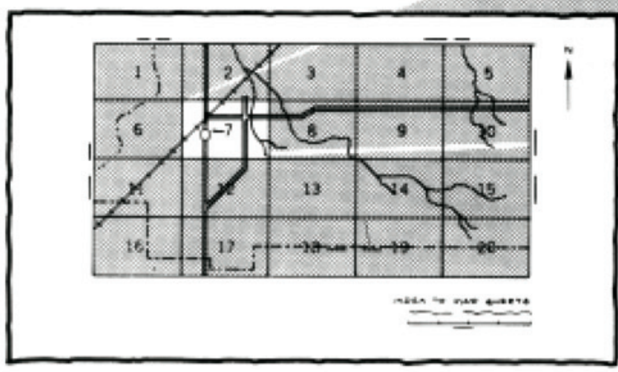
SOIL SURVEY OF CRAIGHEAD COUNTY ARKANSAS

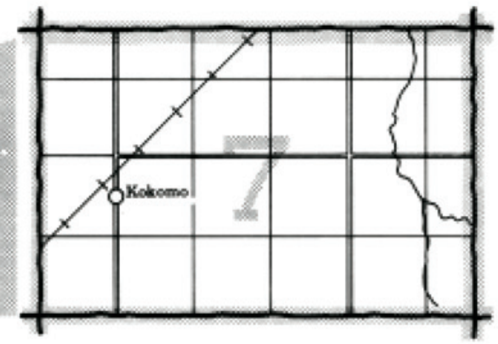


UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
in cooperation with the
ARKANSAS AGRICULTURAL EXPERIMENT STATION

HOW TO USE

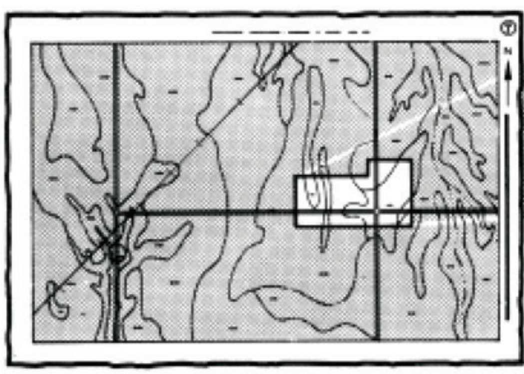
1. Locate your area of interest on the ''Index to Map Sheets''

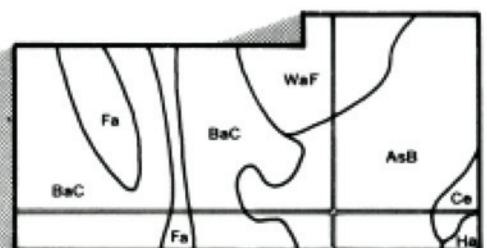




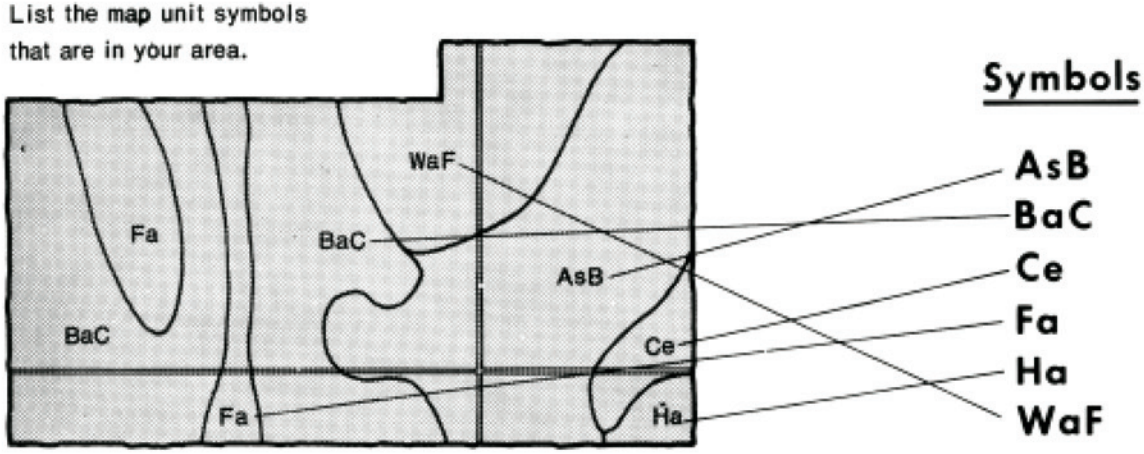
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



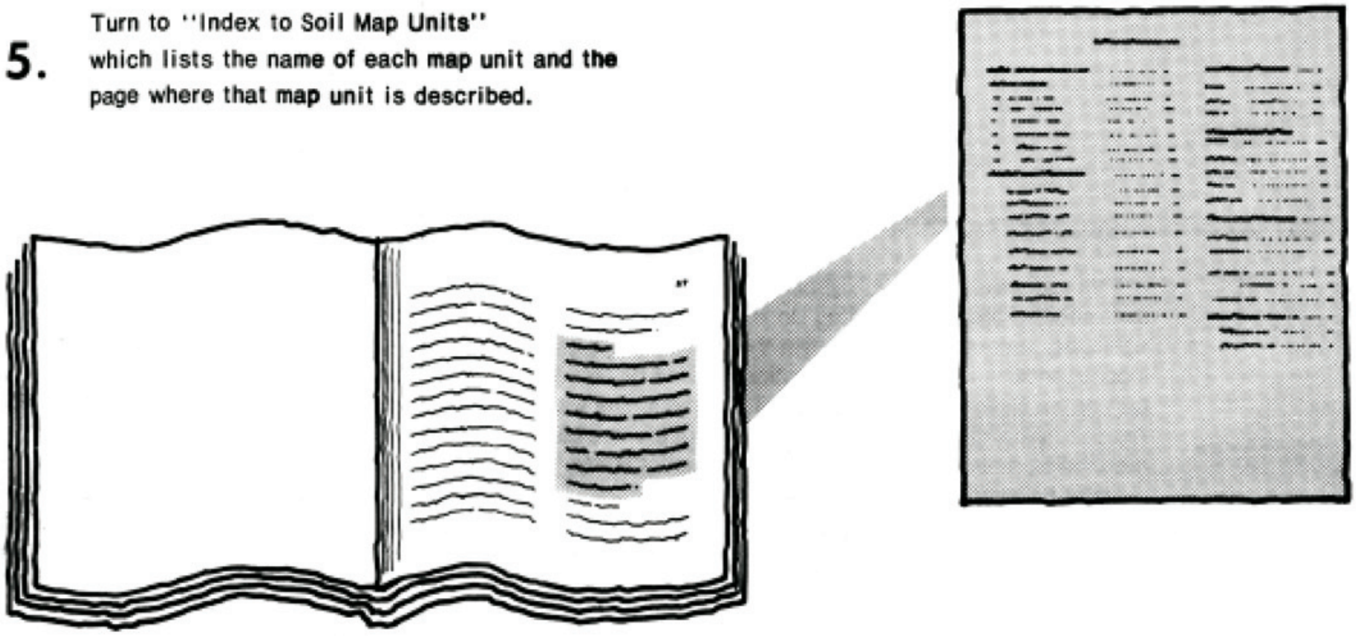


4. List the map unit symbols that are in your area.

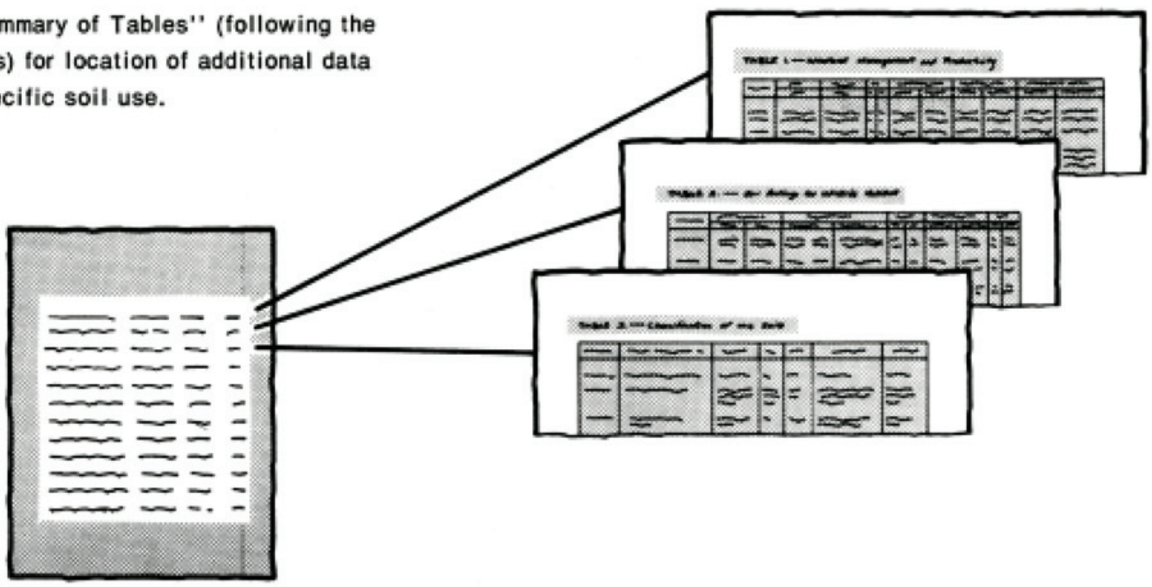


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1970 to 1975. Soil names and descriptions were approved in 1976. Unless otherwise indicated, statements in the publications refer to conditions in the survey area in 1975. This survey was made cooperatively by the Soil Conservation Service and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Craighead County Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover: In the foreground is a pasture on Loring and Memphis soils; in the background are fields of rice and soybeans on Falaya, Calhoun, and Jackport soils.

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Issued December, 1979

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Summary of Tables

Foreword

The Soil Survey of Craighead County, Arkansas contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

This soil survey has been prepared for many different users. Farmers, ranchers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

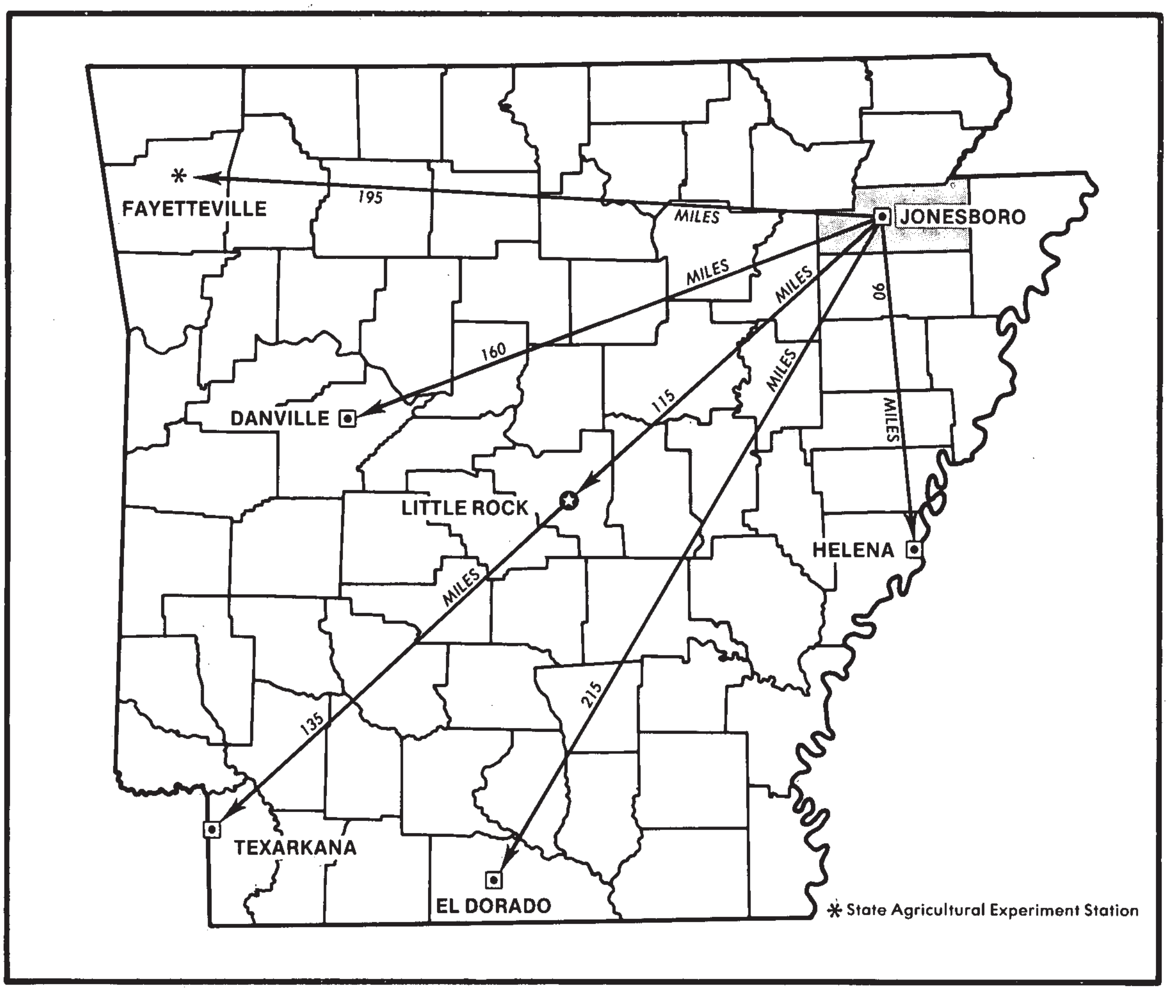
Great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soi. is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

This soil survey can be useful in the conservation, development, and productive use of soil, water, and other resources.

M J Spears

M.J. Spears
State Conservationist
Soil Conservation Service



Location of Craighead County in Arkansas.

SOIL SURVEY OF CRAIGHEAD COUNTY, ARKANSAS

By Dick V. Ferguson, Soil Conservation Service

Soils surveyed by Dick V. Ferguson and Mose Minor, Jr., Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with the Arkansas Agricultural Experiment Station

CRAIGHEAD COUNTY is in northeast Arkansas (see map on facing page). It is almost rectangular, about 44 miles long and 12 to 20 miles wide. The total area, including large bodies of water, is 458,880 acres. According to the United States Census, the land area, including bodies of water of less than 40 acres and streams less than 1/8 mile wide, is 458,327 acres, or 716 square miles.

Craighead County is bounded on the east by Mississippi County, on the south by Poinsett County, on the west by Jackson and Lawrence Counties, and on the north by Lawrence and Greene Counties and by Dunklin County, Missouri.

In 1970, the population of Craighead County was 52,068. Jonesboro, the county seat and main trading center, had a population of 27,050.

In Craighead County, farming is the most important economic enterprise. Other important factors in the economy are manufacturing, construction, transportation, the university, and supporting businesses for these enterprises. Urban expansion is proceeding rapidly in the Jonesboro area.

General nature of the county

In the paragraphs that follow, the farming, physiography and drainage, and climate of Craighead County are described.

Uplands, where the soils formed in layers of windblown sediment, and their associated local flood plains are mainly in the western and central parts of the county. Crowleys Ridge is in this area. The windblown material has been removed by erosion, and the underlying gravelly and sandy material is exposed in some areas of Crowleys Ridge. Except for the steep slopes on Crowleys Ridge, most of the soils on uplands are suitable for cultivation or improved pasture. Excess water is a moderate to very severe hazard on the level tracts, as is erosion in the more sloping areas.

The bottom lands and the associated lakes and rivers are mainly east of Crowleys Ridge. The soils in this area are suitable for farming. Except for a few large, wooded tracts within the St. Francis River Floodway, nearly all the area is cultivated. Excess water drains away slowly or ponds and is a moderate to very severe hazard over the area of bottom lands. Erosion is insignificant except in a few areas.

Elevation above mean sea level ranges from about 500 feet atop Crowleys Ridge near the northern border to about 210 feet near the point where the St. Francis River crosses the south boundary of the county.

Most of the soils in the county contain moderate to high amounts of plant nutrients and are among the most fertile in the state. The bottom land area is part of the combined flood plains of the Mississippi River, Little River, and St. Francis River. It was subject to frequent flooding by these rivers until levees were constructed. The last widespread flood occurred in 1937. Since then, major flooding has been negligible except in the St. Francis River Floodway and on the Cache River and tributaries. Even in these areas, which include about 9 percent of the land area of the county, the floods occur mainly between January and June. In most years, the flooded soils dry early enough that warm-season crops can be grown.

Farming

Farming in Craighead County spread from the better drained parts of the uplands to the higher parts of the natural levees, then gradually to the poorly drained flats. According to the 1974 Census of Agriculture, about 354,940 acres, or 77 percent of the county, is in farms. The rest is woodland, cities and towns, federally owned land, and transportation and utility facilities. The early economy was based on the plantation system, and cotton was the main cash crop.

Farming is still the principal livelihood, but cropping systems have become more diversified. Since acreage allot-

ments were placed on cotton, the importance of that crop has declined. As machinery has replaced livestock as a source of power, corn and other feed crops have also declined in importance. Soybeans and small grain have increased in importance.

Most farming in Craighead County is general. Soybeans, cotton, and rice are the main crops, and some wheat and grain sorghum are grown. Beef cattle are raised on some farms. Table 1 shows the acreage of principal crops and pasture in 1969 and 1974, and table 2 shows the kind and number of livestock in the same years. Over much of the county, improved crop varieties, improved drainage outlets, major flood control measures on the flood plains, and other improved management techniques have led to rapid expansion of farming in the wetter areas and a great reduction in acreage of woodland.

According to the 1974 Census of Agriculture, nearly 77 percent of the land area was in farms. The rest consisted of large wooded tracts, cities, towns, state-owned land, and transportation and utility facilities.

Farms in Craighead County, as in most of eastern Arkansas, are decreasing in number and increasing in size. Between 1969 and 1974, the number of farms decreased from 1,809 to 1,369, while the average size increased from 223 acres to 259 acres.

Farms of 500 acres and larger increased from 195 in 1969 to 208 in 1974. All size classes of farms smaller than 500 acres decreased in number. Farms of 50 to 500 acres decreased the most in number. The number of farms larger than 1,000 acres increased from 51 to 60. Of the farm operators in the county in 1974, 572 were full owners, 456 were part owners, and 341 were tenants. Of these operators, 407 had a principal occupation other than farming.

The numbers of cattle and calves in the county have been decreasing for several years but are again on the increase. Most beef cattle are of good grade, but milk cows generally are kept mainly for home use.

Farm-related industrial enterprises in the county are varied. They include cotton gins, compresses, and warehouses; grain and soybean elevators and driers served by railway and truck line; and farm equipment and supply companies.

Physiography and drainage

The geologic deposits at the surface of Craighead County are alluvium and loess. Generally, alluvium is in the eastern part of the county, and loess is in the western part. These deposits are the parent material of the soils in the county. The alluvial sediments are more than 200 feet thick overlying unconsolidated material. The loess is about 2 to more than 25 feet thick overlying unconsolidated old alluvium and Coastal Plain sediments. Depth to bedrock probably is many hundreds of feet throughout the county.

The alluvium is a mixture of minerals from throughout the Mississippi River Basin. It is derived from many kinds of soils, rocks, and unconsolidated sediments that came from more than 24 states (*3*).

The topography of the county can be divided into three main areas. These are the level to gently undulating bottom lands, the moderately steep to steep Crowleys Ridge, and the level to moderately sloping upland plain west of Crowleys Ridge.

The topography of the bottom lands ranges from broad flats to areas of alternating swales and low ridges. Except along a few streambanks, local differences in elevation are minor. Slopes are generally less than 1 percent, though they are as much as 3 percent on the sides of some low ridges.

In the Crowleys Ridge area, topography is characterized by ridges with narrow, winding tops; short side slopes; and narrow valleys between the ridges. Slopes on the ridges dominantly range from 12 to 40 percent, and along valley drainageways they are generally less than 1 percent.

West of Crowleys Ridge, the upland plain is dominantly level to nearly level; slopes are less than 3 percent. Scattered low ridges and escarpments along drainageways have slopes between 3 and 8 percent.

The drainage in the county is generally southwestward through a system of natural and improved drainageways and connecting artificial channels. The county is well supplied with drainageways. The major natural drains are Buffalo Creek Ditch, Thompson Creek, the Cache River, Big Bay Ditch, Little Bay Ditch, Bayou DeView (Big Creek), Cockle Bur Slough, and the St. Francis River Floodway.

Thompson Creek, the St. Francis River, Cockle Bur Slough, and Buffalo Creek drain the eastern part of the county; Bayou DeView (Big Creek) and Little Bay Ditch drain the central part; and the Cache River drains the western part. All of the county drains into the Mississippi River through the White and St. Francis Rivers. Lakes in the Big Creek watershed and in Craighead Forest furnish recreation, and several smaller lakes are used for fishing and duck hunting. Except for the Crowleys Ridge area, the supply of ground water is abundant. Wells 10 inches in diameter drilled to a depth of about 120 feet furnish good to fair water at rates of about 1,500 to 1,800 gallons per minute.

Climate

Climatic data in this section were specially prepared for the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina.

Craighead County has long, hot summers and rather cool winters. An occasional cold wave brings near-freezing or sub-freezing temperatures but seldom much snow. Precipitation is fairly heavy throughout the year, and prolonged droughts are rare. Summer precipitation falls mainly in afternoon thunderstorms and is adequate for all crops.

Table 3 gives data on temperature and precipitation for the survey area, as recorded at Jonesboro, Arkansas for

the period 1951 to 1975. Table 4 shows probable dates of the first freeze in fall and the last freeze in spring. Table 5 provides data on length of the growing season.

In winter the average temperature is 41 degrees F, and the average daily minimum temperature is 32 degrees. The lowest temperature on record, which occurred at Jonesboro on February 2, 1951, is -3 degrees. In summer the average temperature is 80 degrees, and the average daily maximum temperature is 91 degrees. The highest recorded temperature, which occurred on July 18, 1954, is 108 degrees.

Growing degree days, shown in table 5, are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 24 inches, or 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 5.40 inches at Jonesboro on September 19, 1970. Thunderstorms occur on about 60 days each year, and most occur in summer.

Average seasonal snowfall is 7 inches. The greatest snow depth at any one time during the period of record was 8 inches. On the average, 2 days have at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The percentage of possible sunshine is 70 in summer and 50 in winter. The prevailing wind is from the southwest. Average windspeed is highest, 10 miles per hour, in March.

Severe local storms, including tornadoes, strike in or near the county occasionally, are of short duration, and cause variable and spotty damage.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would locate many soils they already knew something about and perhaps identify some they had never seen before. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material, which has been changed very little by leaching or by the action of plant roots.

The soil scientists recorded the characteristics of the profiles they studied, and they compared those profiles with others in counties nearby and in places more distant. Thus, through correlation, they classified and named the soils according to nationwide, uniform procedures.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the soils on aerial photographs. These photographs show woodlands, buildings, field borders, roads, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called soil map units. Some map units are made up of one kind of soil, others are made up of two or more kinds of soil, and a few have little or no soil material at all. Map units are discussed in the sections "General soil map for broad land use planning" and "Soil maps for detailed planning."

While a soil survey is in progress, samples of soils are taken as needed for laboratory measurements and for engineering tests. The soils are field tested, and interpretations of their behavior are modified as necessary during the course of the survey. New interpretations are added to meet local needs, mainly through field observations of different kinds of soil in different uses under different levels of management. Also, data are assembled from other sources, such as test results, records, field experience, and information available from state and local specialists. For example, data on crop yields under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it is readily available to different groups of users, among them farmers, managers of rangeland and woodland, engineers, planners, developers and builders, homebuyers, and those seeking recreation.

General soil map for broad land use planning

The general soil map at the back of this publication shows, in color, map units that have a distinct pattern of soils and of relief and drainage. Each map unit is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map provides a broad perspective of the soils and landscapes in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. Areas that are, for the most part, suited to certain kinds of farming or to other land uses

can be identified on the map. Likewise, areas of soils having properties that are distinctly unfavorable for certain land uses can be located.

Because of its small scale, the map does not show the kind of soil at a specific site. Thus, it is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The kinds of soil in any one map unit differ from place to place in slope, depth, stoniness, drainage, or other characteristics that affect their management.

The soils in the survey area vary widely in their potential for major land uses. Soil properties that pose limitations to the use are indicated. The ratings of soil potential are based on the assumption that practices in common use in the survey area are being used to overcome soil limitations. These ratings reflect the ease of overcoming the soil limitations and the probability of soil problems persisting after such practices are used.

Each map unit is rated for cultivated farm crops, pasture crops, woodland, and urban uses. Cultivated farm crops are those grown extensively by farmers in the survey area. Pasture crops include those grown for livestock forage production. Woodland refers to land that is producing either trees native to the area or introduced species. Urban uses include residential, commercial, and industrial developments.

The eleven map units in Craighead County are described in the following pages.

Soils formed in alluvial sediments on flood plains, natural levees, terraces, and slack water areas

These soils are in map units 1, 2, 3, 4, and 5. Together, they make up 43 percent of the county. They are within the Southern Mississippi Valley Bottom Lands. The soils west of Crowleys Ridge formed in sediments of the Cache River and its local tributaries. The soils east of Crowleys Ridge formed in sediments of the St. Francis River and its local tributaries.

1. Jackport

Poorly drained, level, loamy soils in broad slack water areas

This map unit extends from north to south in the western part of the county. The level and slightly depressional soils formed in clayey sediments in slack water areas.

This unit makes up about 5 percent of the county. It is about 75 percent Jackport soils and 25 percent soils of minor extent.

Jackport soils are poorly drained. The surface and subsurface layers are silty clay loam, and the subsoil is silty clay and clay. These soils have a seasonal high water table.

The minor soils in this unit are the poorly drained Foley, Amagon, and Fountain soils on terraces, the poorly drained Mhoon soils on flood plains, and the somewhat poorly drained Hillemann and Dundee soils on terraces.

This unit is used mainly for cultivated crops, and there are small patches of hardwood trees. Wetness is the main limitation to use of these soils for farming. Fieldwork is often delayed several days after rain.

These soils, where adequately drained, have fair potential for row crops. They have good potential for rice. The soils in this unit have good potential for woodland, but wetness is a limitation in managing and harvesting the tree crop. Because of soil wetness, a very slow percolation rate, and low strength, this unit has poor potential for most urban uses and for septic tank absorption fields.

2. Dundee-Dubbs-Amagon

Well drained to poorly drained, gently undulating to level, loamy soils on natural levees and broad flats

This map unit is in an area adjacent to the Cache River in the west-central part of the county, and along the St. Francis River Floodway in the eastern part of the county.

This unit makes up about 15 percent of the county. It is about 35 percent Dundee soils, 25 percent Dubbs soils, 15 percent Amagon soils, and 25 percent soils of minor extent.

The somewhat poorly drained Dundee soils are at slightly lower elevations on lower natural levees than the well drained Dubbs soils. Dundee soils are in shallow depressions in low natural levees at slightly higher elevations than the poorly drained Amagon soils. All of these soils have a fine sandy loam or silt loam surface layer. Dundee and Amagon soils have a seasonal high water table.

The minor soils in this unit are the somewhat excessively drained Beulah soils on natural levees and the excessively drained Bruno soils, the somewhat poorly drained Commerce soils, and the poorly drained Mhoon soils on flood plains.

The soils in this unit are used mainly for cultivated crops; frequently flooded areas of Amagon soils are mostly woodland. Dundee and Amagon soils need surface drainage. Fieldwork is normally delayed a few days after a rain because of excess water.

This unit, where adequately drained, has fair potential for cultivated crops. The soils in this unit have good potential for woodland, but wetness is a limitation in managing and harvesting the tree crop. Dundee and Amagon soils have severe limitations for most urban uses and as septic tank absorption fields because of wetness, moderately slow and slow permeability, low strength, and a seasonal high water table. Dubbs soils have slight or moderate limitations for urban uses and as septic tank absorption fields.

3. Sharkey

Poorly drained, level, clayey soils on flood plains and broad slack water flats

This unit is in the eastern part of the county, primarily in the St. Francis River Floodway. These soils are on slack water flats and in frequently flooded areas of flood plains. They formed in clayey sediments.

This unit makes up about 5 percent of the county. It is about 80 percent Sharkey soils and 20 percent soils of minor extent.

Sharkey soils are poorly drained and have a clay surface layer, except in the St. Francis River Floodway. In the Floodway, the texture is variable due to frequent overflows carrying clayey to loamy sediments. These soils have a seasonal high water table within 12 inches or less of the surface during late winter and early spring.

The minor soils in this unit are the poorly drained Mhoon and Amagon soils on flood plains and terraces and the somewhat poorly drained Commerce soils on flood plains.

This unit is used mostly as woodland and for wildlife habitat. Some areas that are protected from flooding are used for cultivated crops. Wetness is the main limitation to use of these soils for row crops.

This unit, where adequately drained, has fair potential for row crops and good potential for rice. Frequently flooded areas have poor potential for most cultivated crops. These soils have good potential for pasture and woodland. They have poor potential for most urban uses; flooding, wetness, and shrink-swell potential are severe limitations.

4. Commerce-Mhoon

Somewhat poorly drained and poorly drained, level to slightly depressional, loamy soils on flood plains

This map unit is in the eastern part of the county. It is on broad flats and in shallow depressions along and in drainageways or former stream channels, sloughs, and former lakebeds.

This unit makes up about 12 percent of the county. It is about 45 percent Commerce soils, 35 percent Mhoon soils, and 20 percent soils of minor extent.

The somewhat poorly drained Commerce soils are at slightly higher elevations than the poorly drained Mhoon soils. Both soils have a seasonal high water table and are frequently flooded where they are in the St. Francis River Floodway. These soils have a silt loam, fine sandy loam, or very fine sandy loam surface layer.

The minor soils in this unit are the poorly drained Roellen soils on flood plains and low terraces and the somewhat poorly drained Convent soils on flood plains.

This unit is used mainly for cultivated crops, except in some areas in the St. Francis River Floodway. Wetness is the main limitation for use of these soils. The water table is at the surface or within 18 inches of the surface during winter and early spring. Fieldwork is delayed several days after a rain because of excess water, and surface drains are needed.

These soils, where adequately drained, have good to fair potential for row crops and small grain. Flooded areas have poor potential for most cultivated crops. The soils in this unit have good potential for woodland, but wetness, especially on Mhoon soils, is a limitation for managing and harvesting the tree crop. These soils have poor potential for most urban uses. A seasonal high water table, poor drainage, and low strength are severe limitations for residential and industrial development.

5. Amagon-Dundee

Poorly drained and somewhat poorly drained, level, loamy soils in depressional parts of low terraces and on higher parts of terraces and natural levees

This unit is in the eastern part of the county. These gently undulating and level soils are in areas of low ridges that alternate with narrow swales.

This unit makes up about 6 percent of the county. It is about 48 percent Amagon soils, 32 percent Dundee soils, and 20 percent soils of minor extent.

Amagon soils are poorly drained and at slightly lower elevations than the somewhat poorly drained Dundee soils. Amagon and Dundee soils have a fine sandy loam or silt loam surface layer. Both soils have a seasonal high water table.

The minor soils in this unit are the poorly drained Sharkey and Roellen soils on back swamps and flood plains, the somewhat poorly drained Commerce soils on flood plains, the well drained Dubbs soils on terraces, and the excessively drained Bruno soils on flood plains.

This unit is used mainly for cultivated crops. Wetness is the main limitation. Farming operations are commonly delayed several days after a rain. Because of excess water, surface drains are needed where the soils are used for row crops.

This unit, where adequately drained, has fair potential for row crops and small grain. Soils in this unit have good potential for woodland, but wetness is a limitation for managing and harvesting the tree crop. These soils have poor potential for most urban uses. The seasonal high water table and slow permeability are severe limitations for dwellings with basements and septic tank absorption fields.

Soils formed in wind-laid and alluvial sediments on uplands

These soils are in map units, 6, 7, and 8. Together they make up about 32 percent of the county. They are within the Southern Mississippi Valley Loessial Terraces. The soils are mostly west of Crowleys Ridge; part of unit 6 and all of unit 8, however, are on benchland east of Crowleys Ridge. These soils average 20 feet higher in elevation than the alluvial sediments on flood plains. These soils formed where the alluvial deposits have been capped by wind-deposited silts.

6. Foley

Poorly drained, level, loamy soils on broad flats on loess plains

This unit is on broad flats along the western boundary of the county and on broad flats of the loess plains east of Crowleys Ridge in the central part of the county. These soils formed in loamy sediments from loesslike material.

This unit makes up about 8 percent of the county. It is about 72 percent Foley soils and 28 percent soils of minor extent.

Foley soils are poorly drained. The surface layer and the upper part of the subsoil are silt loam, and the lower part of the subsoil is silty clay loam and has a high concentration of sodium. These soils have a seasonal high water table.

The minor soils in this unit are the poorly drained Amagon, Calhoun, Fountain, and Jackport soils and the somewhat poorly drained Dundee and Lafe soils. These nearly level to depressional soils are on terraces.

This unit is used mainly for cultivated crops, except for small patches of hardwood trees along drainageways. Wetness is the main limitation; the water table is within 12 inches of the surface during winter and spring. Land grading is hazardous because of the high content of sodium and magnesium in the subsoil. Depth to the sodium-affected layers should be determined before cuts are made.

This unit has fair potential for row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. This unit has fair potential for woodland; however, harvesting of timber is usually limited to drier seasons. Because of soil wetness, and the very slow percolation rate in the subsoil, this unit has severe limitations for septic tank absorption fields and for most urban uses.

7. Hillemann-Henry

Somewhat poorly drained and poorly drained, level, loamy soils on broad flats on loess plains

This map unit is in a single area in the southwestern part of the county. The soils formed in loamy sediments from loess or loesslike material.

This unit makes up about 11 percent of the county. It is about 50 percent Hillemann soils, 30 percent Henry soils, and 20 percent soils of minor extent.

The somewhat poorly drained Hillemann soils are at slightly higher elevations than the poorly drained Henry soils. Henry soils have a fragipan. Both soils have a silt loam surface layer and a seasonal high water table.

The minor soils in this unit are the poorly drained Calhoun soils and the somewhat poorly drained Calloway soils on terraces and the poorly drained Tichnor soils on flood plains.

This unit is used mainly for cultivated crops, except for small patches of hardwood trees. Wetness is the main limitation; the water table is within 6 to 20 inches of the surface during winter and early spring.

This unit, where adequately drained, has fair potential for row crops. It has good potential for rice. The soils in this unit have good potential for woodland, but wetness is a limitation in managing and harvesting the tree crop. The seasonal high water table is a severe limitation which is difficult to overcome. This unit has poor potential for most urban uses.

8. Fountain-Calhoun-Foley

Poorly drained, level, loamy soils on broad flats

This map unit is in the central part of the county. The soils formed in loamy sediments from loess or loesslike material of low sand content.

This unit makes up about 13 percent of the county. It is about 45 percent Fountain soils, 42 percent Calhoun soils, 8 percent Foley soils, and 5 percent soils of minor extent.

Fountain and Foley soils are on broad flats of terraces, and Calhoun soils are on broad flats and in depressions of terraces. All of these soils are poorly drained, have a silt loam surface layer, and have a seasonal high water table during late winter and early spring.

The minor soils in this unit are the somewhat poorly drained Calloway, Dundee, and Lafe soils on terraces, the poorly drained Amagon soils in depressions in terraces, and the moderately well drained Grenada soils on uplands.

This unit is used mainly for cultivated crops, except for small patches of woodland. Wetness is the main limitation to use of these soils for farming. Fieldwork is commonly delayed several days after rain because of excess water, and surface drains are needed. Caution is needed in landforming and grading the Foley soils because of the high content of sodium and magnesium in the subsoil. The depth to the sodium layers should be determined before land leveling cuts are made.

This unit, where adequately drained, has fair potential for row crops. Calhoun soils have good potential for rice, and Fountain and Foley soils have fair potential for rice. Fountain and Calhoun soils have good potential for woodland, but wetness is a limitation in managing and harvesting the tree crop. Foley soils have fair potential for woodland, but wetness also interferes with harvesting the tree crop. Wetness is a severe limitation on these soils and is difficult to overcome. This unit has poor potential for urban uses.

Soils formed in wind-laid sediments and Coastal Plain sediments on uplands

These soils are in map units 9, 10, and 11. Together they make up about 25 percent of the county. They are on the Crowleys Ridge part of the Southern Mississippi Valley Uplands. These soils formed in wind-sorted material from ancient flood plains deposited over older loamy and gravelly alluvial sediments. The valleys are filled with silty material washed from the adjacent uplands.

9. Collins-Falaya

Moderately well drained and somewhat poorly drained, level, loamy soils on flood plains

This map unit is in the central part of the county. These soils formed in loamy sediments derived from loess. They are on upland drainageways and in level areas adjacent to Crowleys Ridge.

This unit makes up about 10 percent of the county. It is about 45 percent Collins soils, 35 percent Falaya soils, and 20 percent soils of minor extent.

Collins soils are moderately well drained and are slightly higher in elevation than Falaya soils. Falaya soils are somewhat poorly drained. Both soils have a silt loam surface layer.

The minor soils in this unit are the somewhat poorly drained Calloway soils on terraces and the poorly drained Tichnor soils on flood plains.

This unit is used mainly for cultivated crops and pasture. Wetness is the main limitation to use of these soils for farming. Fieldwork can be delayed a few days after a rain because of excess water, and surface drains are needed in places.

This unit, where adequately drained, has fair potential for pasture and row crops. These soils have good potential for woodland and pasture. They have fair to poor potential for most urban uses because some areas are occasionally flooded.

10. Brandon-Saffell

Well drained, moderately sloping to moderately steep, loamy and gravelly soils on uplands

This unit is in the north-central part of the county. The Brandon soils formed in a loess mantle about 2 to 4 feet thick overlying Coastal Plain sediments. The Saffell soils formed in Coastal Plain sediments of high gravel content. These soils are on narrow ridges that have moderately sloping and moderately steep side slopes and narrow, winding valleys between ridges.

This unit makes up about 2 percent of the county. It is about 49 percent Brandon soils, about 29 percent Saffell soils, and 22 percent soils of minor extent.

Brandon and Saffell soils are well drained. Brandon soils have a silt loam surface layer, and Saffell soils have a gravelly silt loam and very gravelly silt loam surface layer.

The minor soils in this unit are the moderately well drained Collins and Loring soils, the well drained Memphis soils, and the somewhat poorly drained Falaya soils. Collins and Falaya soils are on flood plains, and Loring and Memphis soils are on uplands.

This unit is used mainly for woodland or pasture. Erosion is the main limitation to the use of these soils.

This unit has poor potential for cultivated crops. Erosion is a very severe hazard on side slopes. These soils have fair potential for pasture, but special erosion control measures are needed. These soils have fair potential for woodland. Because of slopes, these soils have poor potential for most urban uses.

11. Loring-Memphis

Moderately well drained and well drained, nearly level to steep, loamy soils on uplands

This map unit is in the central part of the county. The soils formed in deposits of thick loess. They are nearly level to moderately steep and are on uplands.

This unit makes up about 13 percent of the county. It is about 64 percent Loring soils, 12 percent Memphis soils, and 24 percent soils of minor extent.

Loring soils are moderately well drained and have a fragipan in the subsoil. Memphis soils are well drained and are normally at a slightly higher elevation and have steeper slopes than Loring soils. Memphis and Loring soils have a silt loam surface layer.

The minor soils in this unit are the well drained Brandon and Saffell soils on uplands and the somewhat poorly drained Falaya soils and the moderately well drained Collins soils on flood plains.

This unit is used mainly for pasture and woodland. Erosion is the main limitation to use of these soils.

This unit, except in areas of nearly level soils, has poor potential for cultivated crops. Erosion is a severe to very severe hazard along slopes. These soils have good potential for pasture and woodland. These soils have fair to poor potential for most urban uses.

Broad land use considerations

Each year land is being developed for urban uses in Jonesboro, Bono, Lake City, Bay, and other cities in this county. It is estimated that about 40,000 acres is urban or built-up land. The general soil map is most helpful for planning the general outline of urban areas; it cannot be used for the selection of sites for specific urban structures. In general, in the survey area the soils that have good potential for cultivated crops also have good potential for urban development. The data about specific soils in this survey can be helpful in planning future land use patterns.

Areas where soil properties are so unfavorable that urban development is prohibitive are not extensive in the survey area. However, large areas of the Sharkey unit are on flood plains on which flooding is a severe limitation. Also, the clayey soils of the Jackport unit have poor potential for urban development because of wetness, flooding, and high shrink-swell potential.

In large areas of this county are soils that can be developed for urban uses at lower costs than can the soils in the Sharkey and Jackport units. These include the well drained Dubbs soils in the Dundee-Dubbs-Amagon unit and the nearly level to gently sloping soils of the Loring-Memphis unit. The soils in the Dundee-Dubbs-Amagon unit have fair to good potential as farmland, and this potential should not be overlooked when broad land

uses are considered. The Loring soil in the Loring-Memphis unit is underlain by a fragipan at a depth of less than 40 inches, but other soil properties are favorable for residential and other nonfarm uses.

In some areas are soils that have good potential for rice production but poor potential for nonfarm uses. The Foley, Sharkey, and Jackport units are examples. Wetness and shrink-swell potential are the main limitations to the nonfarm uses of these soils. With proper design and installation of foundations, these limitations can be overcome. It should be noted, however, that these soils have fair potential for cultivated crops, and many farmers have provided sufficient drainage for these crops.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated, and the management concerns and practices needed are discussed.

The map units in this survey area have not all been mapped with the same degree of detail. Delineations of broadly defined units, indicated by footnote on the soil legend at the back of this publication, are apt to be larger and vary more in composition than units mapped in greater detail. Composition has been controlled well enough, however, to be interpreted for the expected use of the soils.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map are phases of soil series.

Soils that have a profile that is almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the underlying substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. The Hillemann series, for example, was named for the town of Hillemann in Woodruff County.

Soils of one series can differ in texture of the surface layer or in the underlying substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Loring silt loam, 1 to 3 percent slopes, is one of several phases within the Loring series.

Some map units are made up of two or more dominant kinds of soil. Such map units are called soil complexes, soil associations, and undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately mixed or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Dundee-Bruno-Commerce complex is an example.

A *soil association* is made up of soils that are geographically associated and are shown as one unit on the map because it is not practical to separate them. A soil association has considerable regularity in geographic pattern and in the kinds of soil that are a part of it. The extent of the soils can differ appreciably from one delineation to another; nevertheless, interpretations can be made for use and management of the soils. Brandon-Saffell association, moderately sloping, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Commerce soils, frequently flooded, is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 6, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

1—Amagon fine sandy loam. This poorly drained, level soil is on broad flats and in shallow depressions on bottom lands. Slope is less than 1 percent. Individual areas range from about 20 to more than 200 acres in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 8 inches thick. The subsurface layer is light brownish gray and gray, mottled silt loam to a depth of about 17 inches. The upper part of the subsoil is light brownish gray, mottled silty clay loam to a depth of about 37 inches. The middle part is grayish brown, mottled silty

clay loam to a depth of about 48 inches. The lower part is light brownish gray, mottled loam to a depth of about 60 inches. The underlying material is light brownish gray, mottled loam that extends to a depth of more than 72 inches.

Included with this soil in mapping are a few small areas of Dundee, Foley, Calhoun, and Fountain soils. Also included are small areas of soils containing more sand than is typical for the Amagon soils. A few small areas of this soil are frequently flooded.

Natural fertility is moderate, and organic matter content is low. The surface layer and subsoil are medium acid to very strongly acid except where limed. The underlying material is medium acid to mildly alkaline. Permeability is slow, and available water capacity is high. The water table is within 12 inches of the surface during winter and early in spring.

Amagon fine sandy loam has fair potential for most crops commonly grown in the county. Nearly all of the acreage is cultivated. The principal crop is soybeans. Cotton, rice, and grain sorghum are also suitable crops. Winter small grain can be grown if surface drainage is adequate. Adapted pasture plants include bermudagrass and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain. A plowpan that has formed below plow depth in places restricts root penetration and movement of water through the soil.

This soil has good potential for cottonwood, cherrybark oak, Nuttall oak, and sweetgum. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Poor drainage, a seasonal high water table, and low strength are severe limitations for dwellings, streets, and industrial sites. Slow permeability and the seasonal high water table are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIw-1. It is in woodland suitability group 1w6.

2—Amagon silt loam. This poorly drained, level soil is on broad flats and in shallow depressions on bottom lands. Slope is less than 1 percent. Individual areas range from about 20 to more than 1,000 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is light brownish gray and gray, mottled silt loam to a depth of about 17 inches. The upper part of the subsoil is light brownish gray, mottled silty clay loam to a depth of about 37 inches. The middle part is grayish brown, mottled silty clay loam to a depth of about 48 inches. The lower part is light brownish gray, mottled loam to a depth of about 60 inches. The underlying material is light brownish gray, mottled loam that extends to a depth of more than 72 inches.

Included with this soil in mapping are a few small areas of Dundee, Foley, Calhoun, and Fountain soils. A few small areas of this soil are frequently flooded.

Natural fertility is moderate, and organic-matter content is low. The surface layer and subsoil are medium acid to very strongly acid except where limed. The underlying material is medium acid to mildly alkaline. Permeability is slow, and available water capacity is high. The water table is within 12 inches of the surface during winter and early in spring.

Amagon silt loam has fair potential for most crops commonly grown in the county. Nearly all of the acreage is cultivated. The principal crop is soybeans (fig. 1). Cotton, rice, and grain sorghum are also suitable crops. Winter small grain can be grown if surface drainage is adequate. Adapted pasture plants include bermudagrass and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain. A plowpan that has formed below plow depth in places restricts root penetration and movement of water through the soil.

This soil has good potential for cottonwood, cherrybark oak, Nuttall oak, and sweetgum. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by using special equipment and by logging during the drier seasons.

This soil has poor potential for most urban uses. Poor drainage, a seasonal high water table, and low strength are severe limitations for dwellings, streets, and industrial sites. Slow permeability and the seasonal high water table are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIw-1. It is in woodland suitability group 1w6.

3—Beulah fine sandy loam, 0 to 1 percent slopes. This somewhat excessively drained, level soil is on higher parts of natural levees. Individual areas range from 10 to 200 acres in size.

Typically, the surface layer is brown fine sandy loam about 8 inches thick. The subsoil is fine sandy loam that extends to a depth of about 50 inches. It is dark yellowish brown in the upper part and yellowish brown in the lower part. The underlying material is yellowish brown loamy sand that extends to a depth of more than 72 inches.

Included with this soil in mapping are a few small areas of Bruno, Dubbs, and Dundee soils and small areas of soils that have a very fine sandy loam surface texture. Also included are areas of soils that are similar to Beulah soils but that have gray mottles in the lower part of the subsoil.

Natural fertility is moderate, and organic matter content is low. Available water capacity is medium to low, and permeability is moderately rapid. The surface layer is strongly acid through medium acid except where limed. The subsoil is strongly acid through medium acid, and the underlying material is medium acid to neutral.

This soil has fair potential for farming. The main crop is cotton. Other suitable crops are soybeans, peanuts, and winter small grain. Truck crops such as green beans, potatoes, sweet corn, tomatoes, okra, and melons are suited. Adapted pasture plants include bermudagrass, bahiagrass, tall fescue, lespedeza, and white clover. Because of the limited available water capacity, droughtiness is a moderate limitation. If the soil is bare in spring, wind erosion is a moderate hazard. In some areas, a plowpan just below plow depth limits root penetration and water movement. Under good management, crops that leave large amounts of residue can be grown safely year after year.

This soil has good potential for cottonwood, cherrybark oak, and Nuttall oak. There are no significant limitations in woodland use or management.

This soil has good potential for dwellings, streets and roads, light industry, and septic tank absorption fields. Limitations for sewage lagoons and sanitary landfills are severe because permeability is moderately rapid. Pollution of ground water in local areas is a hazard if sanitary facilities are established on this soil.

This soil is in capability unit IIs-1. It is in woodland suitability group 2o4.

4—Beulah fine sandy loam, gently undulating. This somewhat excessively drained soil is on the higher parts of natural levees. It is in areas of alternating long, narrow swales and low ridges that rise 1 foot to 4 feet above the swales. These complex slopes range from 0 to 3 percent. Individual areas range from about 20 to 400 acres in size.

Typically, the surface layer is brown fine sandy loam about 8 inches thick. The subsoil is fine sandy loam that extends to a depth of about 50 inches. It is dark yellowish brown in the upper part and yellowish brown in the lower part. The underlying material is yellowish brown loamy sand that extends to a depth of more than 72 inches.

Included with this soil in mapping are a few small areas of Dubbs, Dundee, and Bruno soils.

This soil is moderate in natural fertility. Content of organic matter is medium to low. The surface layer is strongly acid through medium acid except where limed. The subsoil is strongly acid through medium acid, and the underlying material is medium acid to neutral.

This soil has fair potential for farming. The main crops are cotton and soybeans. Other suitable crops are peanuts, grain sorghum, and winter small grain. Truck crops such as okra, green beans, potatoes, sweet corn, tomatoes, and melons are suited. Adapted pasture plants include bermudagrass, bahiagrass, annual lespedeza, white clover, and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain. The soil warms early in spring, and crops can be planted early. Because of the limited available water capacity, droughtiness is a concern during seasons of below-normal rainfall. The hazard of wind erosion is moderate during spring if the surface is bare. Soils in the swales remain moist longer after a rain, but excess water rarely stands long enough to damage crops. Tillage is occasionally delayed for a few days after heavy rain because of excess water in swales. A plowpan just below plow depth limits root penetration and water movement.

This soil has good potential for cottonwood, cherrybark oak, and Nuttall oak. There are no significant limitations in woodland use or management.

This soil has good potential for dwellings, streets and roads, light industry, and septic tank absorption fields. Limitations for sewage lagoons and sanitary landfills are severe because permeability is moderately rapid. Pollution of ground water in local areas is a hazard if sanitary facilities are established on this soil.

This soil is in capability unit IIs-1. It is in woodland suitability group 2o4.

5—Brandon-Saffell association, moderately sloping. This association consists of well drained soils in a regular and repeating pattern on Crowleys Ridge. The Brandon soil is mostly on narrow ridge crests and interfluves; it formed in moderately thick wind-laid sediments and in the underlying gravelly water-laid sediments. The Saffell soil is mainly on lower parts of side slopes; it formed in gravelly water-laid sediments. Slope is 8 to 12 percent. The mapped areas range from about 20 to more than 400 acres in size.

Brandon silt loam makes up about 50 percent of this association. Typically, the surface layer is dark grayish brown silt loam about 1 inch thick. The subsurface layer is brown silt loam to a depth of 5 inches. The subsoil is yellowish red silty clay loam to a depth of about 39 inches. The underlying material is yellowish red very gravelly and gravelly sandy clay loam that extends to a depth of more than 72 inches (fig. 2).

Brandon soils have moderate permeability in the subsoil and moderately rapid permeability in the underlying gravelly material. Natural fertility and organic-matter content are low. These soils are strongly acid or very strongly acid throughout the profile except for the surface layer where limed. Available water capacity is medium.

Saffell soils make up about 30 percent of this association. Typically, the surface layer is dark grayish brown gravelly silt loam about 3 inches thick. The subsurface layer is yellowish brown very gravelly silt loam to a depth of about 15 inches. The upper part of the subsoil is strong brown very gravelly sandy clay loam to a depth of about 27 inches. The lower part is red very gravelly sandy clay loam to a depth of about 58 inches. The underlying material is red gravelly sandy loam that extends to a depth of 72 inches or more.

Saffell soils have moderate permeability and low available water capacity. Natural fertility and organic matter content are low. These soils are strongly acid or very strongly acid throughout the profile.

The remaining 20 percent of this association is small areas of Loring and Memphis soils.

These soils have poor potential for cultivated crops. They have fair potential for pasture if kept in permanent

cover and if special erosion control measures are used. Runoff is rapid, and the hazard of erosion is very severe. Management concerns include proper stocking, controlled grazing, and weed and brush control.

These soils have fair potential for cherrybark oak, pine, southern red oak, and sweetgum. There are no significant limitations in woodland use and management.

These soils have poor potential for most urban uses. Slope is a moderate limitation for dwellings, roads and streets, and septic tank absorption fields. The moderately rapid permeability below a depth of 40 inches is a severe limitation on the Brandon and Saffell soils. These soils have severe limitations for light industry.

Brandon soils are in capability unit IVe-1 and woodland suitability group 3o7. Saffell soils are in capability unit IVe-1 and woodland suitability group 4f8.

6—Brandon-Saffell association, moderately steep. This association consists of well drained soils in a regular and repeating pattern on Crowleys Ridge. The Brandon soil is mostly on narrow ridge crests and interfluves; it formed in moderately thick wind-laid sediments and in the underlying gravelly water-laid sediments. The Saffell soil is mainly on lower parts of side slopes on uplands; it formed in gravelly water-laid sediments. Slope is 12 to 20 percent. The mapped areas range from about 20 to more than 600 acres in size.

Brandon silt loam makes up about 50 percent of this association. Typically, the surface layer is dark grayish brown silt loam about 1 inch thick. The subsurface layer is brown silt loam to a depth of 5 inches. The subsoil is yellowish red silty clay loam to a depth of about 39 inches. The underlying material is yellowish red very gravelly and gravelly sandy clay loam that extends to a depth of more than 72 inches.

Brandon soils have moderate permeability in the subsoil and moderately rapid permeability in the underlying gravelly material. Natural fertility and organic-matter content are low. These soils are strongly acid or very strongly acid throughout the profile. Available water capacity is moderate.

Saffell soils make up about 30 percent of this association. Typically, the surface layer is dark grayish brown gravelly silt loam about 3 inches thick. The subsurface layer is yellowish brown very gravelly silt loam to a depth of about 15 inches. The upper part of the subsoil is strong brown very gravelly sandy clay loam to a depth of about 27 inches. The lower part is dark red and red very gravelly sandy clay loam to a depth of about 58 inches. The underlying material is red gravelly sandy loam that extends to a depth of 72 inches or more.

Saffell soils have moderate permeability and low available water capacity. Natural fertility and organic matter content are low. These soils are strongly acid or very strongly acid throughout the profile.

The remaining 20 percent of this association is small areas of Loring and Memphis soils, and a few areas of active gravel pits, ridges, and piles of excavated materials. In places where the pits are no longer active, native grasses and trees (fig. 3) have been planted or have established themselves.

These soils have poor potential for cultivated crops. They have fair potential for pasture if kept in permanent cover and if special erosion control measures are used. Runoff is rapid, and the hazard of erosion is very severe. Management concerns include proper stocking, controlled grazing, and weed and brush control.

These soils have fair potential for cherrybark oak, pine, southern red oak, and sweetgum. There are no significant limitations in woodland use and management.

These soils have poor potential for most urban uses. Slope is a severe limitation for dwellings, roads and streets, and septic tank absorption fields. The moderately rapid permeability below a depth of 40 inches is a severe limitation on the Brandon and Saffell soils. These soils have severe limitations for light industry.

Brandon soils are in capability unit VIe-1 and woodland suitability group 3r8. Saffell soils are in capability unit VIe-1 and woodland suitability group 4f8.

7—Bruno loamy sand. This excessively drained soil is on the higher parts of natural levees. It occurs on long, low, narrow ridges and on round or oblong mounds or spots. These areas are locally known as "sand blows." This soil also occurs in depressional blown-out areas (areas from which wind has removed the surface layer). Slope is dominantly less than 1 percent. Individual areas range from about 1 acre to 40 acres in size.

Typically, the surface layer is dark grayish brown loamy sand about 10 inches thick. The underlying material is stratified layers of dark yellowish brown, light brownish gray, brown, pale brown, and dark grayish brown loamy sand, fine sandy loam, and silt loam that extend to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Dubbs, Beulah, Amagon, Dundee, and Commerce soils.

This soil is low in natural fertility. Content of organic matter is low. Permeability is rapid, and available water capacity is low. Reaction is strongly acid through mildly alkaline in all horizons.

This soil has poor potential for farming. The main crops are cotton, winter small grain, and soybeans. Truck crops such as sweet potatoes, peanuts, and melons are grown. Adapted pasture plants include bermudagrass and improved bermudagrasses. The soil warms early in spring and can be planted early. Because of limited available water capacity, droughtiness is a concern during summer. The hazard of wind erosion is moderate to severe during spring if the surface is left bare.

This soil has fair to good potential for cherrybark oak, water oak, sweetgum, willow oak, and river birch. Droughtiness is the major limitation in woodland use or management.

This soil has good potential for dwellings, streets and roads, light industry, and septic tank absorption fields. Irrigation is needed to maintain lawns and shrubbery

during dry periods. Sewage lagoons and sanitary landfills are severely limited because permeability is rapid. Pollution of ground water in local areas is a hazard if sanitary facilities are established on this soil.

This soil is in capability unit IIIs-1. It is in woodland suitability group 2s5.

8—Calhoun silt loam. This level, poorly drained soil is on broad flats. Slope is less than 1 percent. Individual areas range from 20 to several hundred acres in size.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is light brownish gray and light gray, mottled silt loam to a depth of about 23 inches. The upper part of the subsoil is grayish brown, mottled silt loam to a depth of about 35 inches. The lower part is grayish brown, mottled silty clay loam to a depth of 53 inches. The underlying material is light brownish gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Amagon, Foley, Henry, and Hillemann soils.

This soil is moderate in natural fertility. Content of organic matter is low. The surface layer is medium acid to very strongly acid except where limed. The subsoil is very strongly acid to neutral, and the underlying material is strongly acid to mildly alkaline. Permeability is slow, and available water capacity is high. The water table is seasonally high. It ranges between depths of 0 and 24 inches during winter and early spring.

This soil has fair potential for row crops and small grain. Farming operations can be delayed several days after a rain because of excess water, and surface drains are needed in many places. The main crop is soybeans. Other suitable crops are cotton, rice (fig. 4), and grain sorghum. Winter small grain can be grown where surface drainage is adequate. Adapted pasture plants include bermudagrass, bahiagrass, and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for cherrybark oak, water oak, sweetgum, and Nuttall oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIw-1. It is in woodland suitability group 3w9.

9—Calloway silt loam, 0 to 1 percent slopes. This somewhat poorly drained, level soil is on broad uplands. Individual areas range from about 20 to 400 acres in size.

Typically, the surface layer is brown silt loam about 6 inches thick. The upper part of the subsoil is light yellowish brown silt loam to a depth of about 17 inches. The next layer is light brownish gray silt loam to a depth of about 28 inches. The next layer, a brittle fragipan, is grayish brown, yellowish brown, and mottled yellowish and brownish silt loam to a depth of about 66 inches. Below this is mottled pale brown and light yellowish brown silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Grenada, Henry, Hillemann, and Calhoun soils.

This soil is moderate in natural fertility and organic-matter content. The upper part of the soil is medium acid to very strongly acid. The lower part is strongly acid to mildly alkaline. Permeability is slow, and available water capacity is medium. The fragipan somewhat restricts the penetration of roots and the movement of water but does not seriously affect soil productivity or the choice of plants. Excess water is a moderate hazard, and farming operations are delayed several days after a rain unless surface drains are installed.

This soil has fair potential for most crops grown in the county. Nearly all the acreage is cultivated. Rice, soybeans, and cotton are suitable crops. Winter small grain can be grown if surface drainage is adequate. Adapted pasture plants are bermudagrass, tall fescue, and bahiagrass.

This soil has good potential for cherrybark oak, Shumard oak, sweetgum, and water oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings and industrial sites. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIw-2. It is in woodland suitability group 3w8.

10—Calloway silt loam, 1 to 3 percent slopes. This somewhat poorly drained, nearly level soil is on uplands. Individual areas range from 10 to more than 400 acres in size.

Typically, the surface layer is brown silt loam about 5 inches thick. The upper part of the subsoil is light yellowish brown silt loam to a depth of about 17 inches. The next layer is light brown silt loam to a depth of about 17 inches. The next layer is light brownish gray silt loam to a depth of about 28 inches. The next layer, a brittle fragipan, is grayish brown, yellowish brown, and mottled yellowish and brownish silt loam to a depth of about 66 inches. Below this layer is mottled pale brown and light yellowish brown silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Grenada, Calhoun, Hillemann, and Foley soils.

This soil is moderate in natural fertility and organic-matter content. The upper part of the soil is medium acid to very strongly acid. The lower part is strongly acid to mildly alkaline. Permeability is slow, and available water capacity is medium. The fragipan restricts the penetration

of roots and the movement of water but does not seriously affect soil productivity or the choice of plants. Crops on this soil respond well to fertilization, and good tilth is easy to maintain.

This soil has fair potential for cultivated crops. Runoff is medium, and erosion is a serious hazard on long slopes. Crops that leave large amounts of residue can be grown year after year if contour cultivation, cross-slope farming, and other good management is used. The principal crops are soybeans and cotton, and rice where slopes are 1 percent. Other crops are corn, grain sorghum, and winter small grain. Adapted pasture plants include bermudagrass, tall fescue, and bahiagrass.

This soil has good potential for cherrybark oak, Shumard oak, sweetgum, and willow oak. There are no significant limitations to woodland use or management.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings and light industry. Wetness and slow permeability are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIe-2. It is in woodland suitability group 3w8.

11—Collins silt loam, occasionally flooded. This level, moderately well drained soil is on upland drainageways and foot slopes adjacent to Crowleys Ridge. Slope is less than 1 percent. Individual areas range from about 20 to 600 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The next layer is dark yellowish brown silt loam to a depth of about 14 inches over yellowish brown and brown, mottled silt loam to a depth of about 30 inches. Below this is light brownish gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Falaya soils.

This soil is moderate in natural fertility. Organic-matter content is low. The soil is strongly acid or very strongly acid throughout except for the surface layer where limed. Permeability is moderate, and available water capacity is high.

This soil has fair potential for row crops and small grain. Occasional flooding for short durations is a slight to moderate hazard. The main crops are soybeans, cotton, and winter small grain. The soil has good potential for pasture and hay crops. Adapted pasture plants include bermudagrass, tall fescue, bahiagrass, and lespedeza. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for eastern cottonwood, cherrybark oak, and green ash. There are no significant limitations in woodland use or management.

This soil has poor potential for most urban uses. Occasional flooding is a severe limitation in some areas for community development and sanitary facilities.

This soil is in capability unit IIw-1. It is in woodland suitability group 1o7.

12—Commerce very fine sandy loam. This somewhat poorly drained, level soil is on broad flats and in slightly depressional areas on young natural levees. Slope is dominantly less than 1 percent. Individual areas range from 20 to 640 acres in size.

Typically, the surface layer is dark grayish brown very fine sandy loam about 8 inches thick. The next layer is grayish brown, mottled silt loam to a depth of about 14 inches. The upper part of the subsoil is grayish brown, mottled silt loam to a depth of about 23 inches. The lower part is grayish brown, mottled silty clay loam to a depth of about 40 inches. The underlying material is grayish brown, mottled silty clay loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Convent and Mhoon soils. Also included are small areas of soils having a surface texture of fine sandy loam and silt loam. Small areas of soils having more sand in the subsoil than Commerce soils are also included.

Commerce soils are high in natural fertility. Organic-matter content is moderate. These soils are medium acid to neutral in the surface layer, slightly acid to neutral in the subsoil, and neutral to mildly alkaline in the underlying material. There are not too many calcium carbonate concretions. Permeability is moderately slow, and available water capacity is high. The water table is seasonally high during winter and early spring.

Commerce very fine sandy loam has good potential for most crops commonly grown in the county. Nearly all of the acreage is cultivated. The principal crops are cotton (fig. 5), soybeans, and winter small grain.

Adapted pasture plants include bermudagrass, tall fescue, bahiagrass, and white clover. Crops on this soil respond well to fertilization, and tilth is easy to maintain. A plowpan that has formed below plow depth in places restricts root penetration and movement of water through the soil.

This soil has good potential for cottonwood, Nuttall oak, water oak, and sycamore. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation can be overcome by using special equipment and by logging during the drier seasons.

This soil has fair to poor potential for most urban uses. Wetness is a moderate limitation for streets and for dwellings without basements. Wetness and slow permeability are severe limitations for dwellings with basements and for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIw-1. It is in woodland suitability group 1w5.

13—Commerce soils, frequently flooded. This undifferentiated unit consists of level, somewhat poorly drained soils on flood plains along the St. Francis River. The map unit is made up of Commerce silt loam and other Commerce soils having variable surface textures. These soils do not occur in a regular pattern. Individual areas are large enough to map separately, but because of present

and predicted use, they were not separated in mapping. These soils are inundated several times each year. Part of this unit is protected by privately owned levees, which prevent some flooding. Slope is dominantly less than 1 percent but ranges to as much as 2 percent along local drainageways. Individual areas range from about 40 to more than 600 acres in size.

Typically, the surface layer is dark grayish brown very fine sandy loam about 8 inches thick. The next layer is grayish brown, mottled silt loam to a depth of about 14 inches. The upper part of the subsoil is grayish brown, mottled silt loam to a depth of about 23 inches. The lower part is grayish brown, mottled silty clay loam to a depth of about 40 inches. The underlying material is grayish brown, mottled silty clay loam that extends to a depth of 72 inches or more.

Included with these soils in mapping are a few areas of Convent, Mhoon, and Sharkey soils. Also included are small areas of soils having more clay in the subsoil than Commerce soils.

Commerce soils are medium acid to neutral in the surface layer, slightly acid to neutral in the subsoil, and neutral to mildly alkaline in the underlying material. Permeability is moderately slow, and available water capacity is high. The water table is seasonally high, and flooding is frequent during winter and early spring.

These soils have poor potential for farming except in areas protected from flooding. In most years, flooding occurs during the period December to June. Crops, such as soybeans and grain sorghum, that require a short growing season can be grown, but flooding is likely to damage the crop in some years. The best suited pasture plant is bermudagrass.

These soils have good potential for cottonwood, Nuttall oak, water oak, and sycamore. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation can be overcome by using special equipment and by logging during the drier seasons.

These soils have very poor potential for urban uses. Wetness and flooding are the main limitations. These limitations can be overcome only by major flood control and drainage measures.

This is in capability unit Vw-2. It is in woodland suitability group 1w5.

14—Convent fine sandy loam. This level soil is on broad flats on flood plains. Slope is 1 percent or less. Individual areas range from about 10 to 160 acres or more.

Typically, the surface layer is dark grayish brown fine sandy loam about 11 inches thick. The underlying material by layers is grayish brown, mottled silt loam; light brownish gray, mottled silt loam; pale brown, mottled very fine sandy loam and silt loam; and grayish brown, mottled silty clay loam. It extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Commerce, Falaya, and Mhoon soils. A few areas of this soil are occasionally flooded and have slopes of 2 or 3 percent along local drainageways.

This soil is high in natural fertility. Organic-matter content is moderate. These soils are medium acid to neutral in the surface layer, slightly acid to neutral in the upper part of the underlying material, and medium acid to neutral in the lower part. Permeability is moderate, and available water capacity is high. The water table is within 30 inches of the surface during winter and early spring.

Convent fine sandy loam has good potential for most crops commonly grown in the county. Nearly all of the acrage is cultivated. The principal crops are cotton, soybeans, and winter small grain.

Adapted pasture plants include bermudagrass, tall fescue, bahiagrass, and white clover. Crops on this soil respond well to fertilization, and tilth is easy to maintain. A plowpan that forms below plow depth in places restricts root penetration and movement of water through the soil.

This soil has good potential for cottonwood, Nuttall oak, water oak, and sycamore. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by using special equipment and by logging during the drier seasons.

This soil has fair to poor potential for most urban uses. Wetness is a moderate limitation for streets and for dwellings without basements. Wetness is a severe limitation for dwellings with basements and for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIw-1. It is in woodland suitability group 1w5.

15—Dubbs fine sandy loam, 0 to 1 percent slopes. This well drained soil is on the higher parts of natural levees. Individual areas range from about 20 to 200 acres in size.

Typically, the surface layer is brown fine sandy loam about 12 inches thick. The upper part of the subsoil is dark yellowish brown silt loam to a depth of about 20 inches. The middle part is dark brown silt loam and dark brown, mottled silty clay loam to a depth of about 41 inches. The lower part is dark brown loam to a depth of about 45 inches. The underlying material is yellowish brown loamy sand that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Beulah and Dundee soils.

This soil is moderate in natural fertility. Content of organic matter is low. Permeability is moderate, and available water capacity is high. The soil ranges from medium acid to very strongly acid except for the surface layer where limed.

This soil has fair to good potential for row crops and small grain. Minimum tillage and the use of cover crops help reduce runoff and control erosion. The main crops are cotton and soybeans. Other suitable crops are grain sorghum and winter small grain. Adapted pasture plants include bermudagrass, tall fescue, and white clover. Crops

on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for cottonwood, cherrybark oak, sweetgum, Nuttall oak, Shumard oak, and willow oak, There are no significant limitations in woodland use or management.

This soil has fair potential for most urban uses. Limitations for sewage lagoons are moderate because of moderate permeability.

This soil is in capability unit I-1. It is in woodland suitability group 2o4.

16—Dubbs fine sandy loam, gently undulating. This well drained soil is in areas where narrow swales alternate with low ridges that rise 2 to 5 feet above the swales. The areas generally are on the tops and sides of older natural levees. Slope is less than 3 percent. Individual areas range from 10 to 160 acres in size.

Typically, the surface layer is brown fine sandy loam about 12 inches thick. The upper part of the subsoil is dark yellowish brown silt loam to a depth of about 20 inches. The middle part is dark brown silt loam and dark brown, mottled silty clay loam to a depth of about 41 inches. The lower part is dark brown loam to a depth of about 45 inches. The underlying material is yellowish brown loamy sand that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Beulah, Dundee, and Amagon soils.

This soil is moderate in natural fertility. Content of organic matter is low. Permeability is moderate, and available water capacity is high. The soil ranges from medium acid to very strongly acid except for the surface layer where limed.

This soil has fair to good potential for row crops and small grain. Erosion is a moderate hazard if row crops are grown. Minimum tillage and the use of cover crops help reduce runoff and control erosion. The main crops are cotton and soybeans. Other suitable crops are grain sorghum (fig. 6) and winter small grain. Truck crops such as green beans, potatoes, sweet corn, tomatoes, strawberries, and melons are suited. Adapted pasture plants include bermudagrass, tall fescue, and bahiagrass. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for cottonwood, cherrybark oak, Nuttall oak, Shumard oak, and willow oak. There are no significant limitations in woodland use or management.

This soil has fair potential for most urban uses. Limitations for sewage lagoons are moderate because of moderate permeability.

This soil is in capability unit IIe-1. It is in woodland suitability group 2o4.

17—Dubbs silt loam, 0 to 1 percent slopes. This well drained soil is on the higher parts of natural levees. Individual areas range from about 20 to 200 acres in size.

Typically, the surface layer is brown silt loam about 12 inches thick. The upper part of the subsoil is dark yellowish brown silt loam to a depth of about 20 inches. The middle part is dark brown silt loam and dark brown, mottled silty clay loam to a depth of about 41 inches. The lower part is dark brown loam to a depth of about 45 inches. The underlying material is yellowish brown loamy sand that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Beulah and Dundee soils.

This soil is moderate in natural fertility. Content of organic matter is low. Permeability is moderate, and available water capacity is high. The soil ranges from medium acid to very strongly acid except for the surface layer where limed.

This soil has fair to good potential for row crops and small grain. Minimum tillage and the use of cover crops help reduce runoff and control erosion. The main crops are cotton and soybean. Other suitable crops are grain sorghum and winter small grain. Adapted pasture plants include bermudagrass, tall fescue, and white clover. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for cottonwood, cherrybark oak, sweetgum, Nuttall oak, Shumark oak, and willow oak. There are no significant limitations in woodland use or management.

This soil has fair potential for most urban uses. Limitations for sewage lagoons are moderate because of moderate permeability.

This soil is in capability unit I-1. It is in woodland suitability group 2o4.

18—Dundee fine sandy loam. This soil is on the lower parts of older natural levees. Slope is dominantly less than 1 percent. Individual areas range from about 10 to 300 acres or more in size.

Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The upper part of the subsoil is dark grayish brown, mottled silt loam to a depth of about 19 inches. The middle part is grayish brown, mottled silty clay loam to a depth of about 45 inches. The lower part is light brownish gray, mottled silt loam to a depth of about 58 inches. The underlying material is gray, mottled loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Amagon and Dubbs soils. Also included are small areas of gently undulating Dundee soils on levees.

Dundee soils are moderate in natural fertility. Organic-matter content is low. The surface layer and subsoil are medium acid to very strongly acid except for the surface layer where limed. The underlying material is neutral to very strongly acid. Permeability is moderately slow, and available water capacity is high. Crops on these soils respond well to fertilizer. Tilth is easy to maintain. In places, a plowpan that has formed below plow depth restricts roots penetration and movement of water into and through the soil. Some areas within the St. Francis River Floodway are subject to occasional flooding. Some

areas are subject to slight erosion. The water table is within about 2 feet of the surface during winter and early spring.

This soil has fair potential for row crops and small grains. Excess water is a moderate hazard, and surface drains are needed in places. The main crops are cotton and soybeans. Other suitable crops are grain sorghum and winter small grains. Adapted pasture plants include bermudagrass, bahiagrass, and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for cottonwood, cherrybark oak, sweetgum, and water oak. Wetness is a moderate limitation in managing and harvesting the tree crop.

This soil has fair to poor potential for most urban uses. Wetness and high shrink-swell potential are moderate limitations for streets and for dwelllings without basements. Wetness and slow permeability are severe limitations for dwellings with basements and for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIw-3. It is in woodland suitability group 2w5.

19—Dundee silt loam. This level soil is on the lower parts of natural levees. Slope is less than 1 percent. Individual areas range from about 20 to 300 acres in size.

Typically, the surface layer is brown silt loam about 7 inches thick. The upper part of the subsoil is dark grayish brown, mottled silt loam to a depth of about 19 inches. The middle part is grayish brown, mottled silty clay loam to a depth of about 45 inches. The lower part is light brownish gray, mottled silt loam to a depth of about 58 inches. The underlying material is gray, mottled loam that extends to a depth of more than 72 inches.

Included with this soil in mapping are a few small areas of Amagon, Dubbs, and Beulah soils.

This soil is moderate in natural fertility. Content of organic matter is low. The surface layer is medium acid to very strongly acid except where limed. The subsoil is medium acid to very strongly acid, and the underlying material is neutral to very strongly acid. Permeability is moderately slow, and available water capacity is high. The water table is within about 2 feet of the surface during winter and early spring.

This soil has fair potential for row crops and small grain. The main crops are soybeans and rice. Excess water is a hazard, and surface drains are needed in places. Where surface drains are not used, farming operations are commonly delayed in the spring. Adapted pasture plants include bermudagrass, bahiagrass, and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain.

This soil has good potential for cottonwood, cherrybark oak, sweetgum, and water oak. Wetness is a moderate limitation in managing and harvesting the tree crop.

This soil has fair to poor potential for most urban uses. Wetness is a moderate limitation for streets and for dwellings without basements. Wetness and slow permeability are severe limitations for dwellings with basements and for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIw-3. It is in woodland suitability group 2w5.

20—Dundee-Bruno-Commerce complex. This complex consists of somewhat poorly drained to excessively drained soils. The soils are in areas so intermingled that it was not practical to separate them on the soil map. They are in an area where low, narrow ridges alternate with narrow flats on natural levees. The nearly level Bruno soils are on the low ridges, and the Dundee and Commerce soils are on the flats. These soils formed in loamy and sandy sediments along bottom lands in the eastern part of the county. Slope is 0 to 2 percent. Individual areas range from 20 to 400 acres in size.

Dundee fine sandy loam makes up about 58 percent of each mapped area. Typically, the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The upper part of the subsoil is dark grayish brown, mottled silt loam to a depth of about 19 inches. The middle part is grayish brown, mottled silty clay loam to a depth of about 45 inches. The lower part is light brownish gray, mottled silt loam to a depth of about 58 inches. The underlying material is gray, mottled loam that extends to a depth of 72 inches or more.

Dundee soils are moderate in natural fertility. Organic-matter content is low. Permeability is moderately slow, and available water capacity is high. The surface layer ranges from very strongly acid to medium acid except where limed. The subsoil is medium acid to very strongly acid, and the underlying material is neutral to very strongly acid. The water table is within about 2 feet of the surface during winter and early spring.

Bruno loamy sand makes up about 16 percent of each mapped area. Typically, the surface layer is dark grayish brown loamy sand about 10 inches thick. The underlying material is stratified layers of dark yellowish brown, light brownish gray, brown, pale brown, and dark grayish brown loamy sand, fine sandy loam, and silt loam that extend to a depth of 72 inches or more.

Bruno soils are low in natural fertility. Content of organic matter is low. Permeability is rapid, and available water capacity is low. Reaction is strongly acid through mildly alkaline in all horizons.

Commerce very fine sandy loam makes up about 12 percent of each mapped area. Typically, the surface layer is dark grayish brown very fine sandy loam about 8 inches thick. The next layer is grayish brown, mottled silt loam to a depth of about 14 inches. The upper part of the subsoil is grayish brown, mottled silt loam to a depth of about 23 inches. The lower part is grayish brown, mottled silty clay loam to a depth of about 40 inches. The underlying material is grayish brown, mottled silty clay loam that extends to a depth of 72 inches or more.

Commerce soils are high in natural fertility. Organic-matter content is moderate. These soils are medium acid

to neutral in the surface layer, slightly acid to neutral in the subsoil, and neutral to mildly alkaline in the underlying material. Permeability is moderately slow, and available water capacity is high.

The remaining 14 percent of this complex consists of Amagon, Dubbs, Convent, and Mhoon soils.

The soils in this complex have fair potential for row crops and small grain. The main crops are soybeans and cotton. Other suitable crops are winter small grain and grain sorghum. Adapted pasture plants include bermudagrass, bahiagrass, and tall fescue. Crops on these soils respond well to fertilization, and tilth is easy to maintain. Droughtiness and wind erosion are a concern on Bruno soils during dry seasons.

The soils in this complex generally have good potential for cherrybark oak, water oak, sweetgum, and cottonwood. Wetness is a moderate limitation in managing and harvesting the tree crop on the Dundee and Commerce soils, but this limitation is easily overcome by logging during dry seasons.

The Dundee and Commerce soils have fair to poor potential, and Bruno soils have good potential, for streets and for dwellings without basements. Sewage lagoons and sanitary landfills have severe limitations because of rapid permeability in the Bruno soils. Dundee and Commerce soils have severe limitations for septic tank absorption fields because of wetness.

Dundee soils are in capability unit IIw-3 and woodland suitability group 2w5. Bruno soils are in capability unit IIIs-1 and woodland suitability group 2s5. Commerce soils are in capability unit IIw-1 and woodland suitability group 1w5.

21—Falaya silt loam, occasionally flooded. This level, somewhat poorly drained soil is on flood plains of upland drainageways and in level areas adjacent to Crowleys Ridge. Slope is less than 1 percent. Individual areas range from about 40 to more than 1,000 acres in size.

Typically, the surface layer is brown silt loam about 6 inches thick. The upper part of the underlying material is brown, mottled silt loam to a depth of about 14 inches. The middle part is grayish brown and light brownish gray, mottled silt loam and silt to a depth of 48 inches. The lower part is a buried soil that is gray and light brownish gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Collins soils.

This soil is moderate in natural fertility. Content of organic matter is low. The soil is medium acid or very strongly acid throughout except for the surface layer where limed. Permeability is moderate, and available water capacity is high.

This soil has fair potential for row crops. Excess water is a moderate hazard; surface drains are needed. The main crops are cotton, soybeans, and winter small grain. This soil has good potential for pasture and hay crops. Adapted pasture plants include bermudagrass, white clover, bahiagrass, and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for cottonwood, cherrybark oak, Nuttall oak, and water oak. Wetness is a moderate limitation in managing and harvesting the tree crop.

This soil has poor potential for most urban uses. Wetness and flooding are severe limitations for dwellings, industrial sites, and septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIw-1. It is in woodland suitability group 1w8.

22—Foley silt loam. This poorly drained, level soil is on broad flats. Slope is less than 1 percent. Individual areas range from about 20 to 600 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsurface layer is light brownish gray, mottled silt loam to a depth of about 12 inches. The upper part of the subsoil is grayish brown, mottled silt loam to a depth of about 20 inches. The middle part is grayish brown and gray, mottled silty clay loam to a depth of about 48 inches. The lower part is grayish brown, mottled silty clay loam to a depth of about 61 inches. The underlying material is grayish brown silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Amagon, Calhoun, Fountain, and Jackport soils.

This soil is moderate in natural fertility. Content of organic matter is low. Permeability is very slow, and available water capacity is medium. The surface layer is very strongly acid to medium acid except where limed. The subsoil and underlying material are medium acid to moderately alkaline. The water table is seasonally high; it is within 12 inches of the surface during winter and early spring.

This soil has fair potential for row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. This soil has fair potential for rice. The main crops are soybeans and rice. Other suitable crops are cotton, winter small grain, and grain sorghum. Adapted pasture plants include bermudagrass and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil. The high content of sodium and magnesium in the subsoil is a severe hazard if deep cuts are to be made in grading and smoothing. Depth to this layer should be determined before cuts are made.

This soil has fair potential for woodland. Some important trees are sweetgum, cherrybark oak, and water oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Very slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIw-2. It is in woodland suitability group 3w9.

23—Fountain silt loam. This level, poorly drained soil is on broad flats of loesslike material. Slope is less than 1 percent. Individual areas range from about 20 to more than 600 acres in size.

Typically, the surface layer is dark brown, mottled silt loam about 5 inches thick. The subsurface layer is light brownish gray, mottled silt loam to a depth of about 15 inches. The upper part of the subsoil is grayish brown, mottled silty clay loam to a depth of about 30 inches. The lower part is light brownish gray, mottled silty clay loam to a depth of about 60 inches. The underlying material is grayish brown, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Amagon and Foley soils and a few small areas of soils that are similar to Fountain soils except that they are slightly more acid in the upper part of the subsoil.

This soil is moderate in natural fertility. Content of organic matter is low. The surface layer is medium acid to neutral, and the subsoil and underlying material are neutral to mildly alkaline. Permeability is moderately slow, and available water capacity is high. The water table is seasonally high; it is within 12 inches of the surface during winter and early spring.

This soil has fair potential for row crops and small grain. Farming operations can be delayed several days after a rain because of excess water; surface drains are needed in many places. The main crop is soybeans. Other suitable crops are cotton, rice, and grain sorghum. Winter small grain can be grown where surface drainage is adequate. Adapted pasture plants include bermudagrass, bahiagrass, and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for loblolly pine, sweetgum, and water oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This is in capability unit IIIw-1. It is in woodland suitability group 2w9.

24—Grenada silt loam, 1 to 3 percent slopes. This moderately well drained, nearly level soil is on uplands of Crowleys Ridge. Individual areas range from 10 to 220 acres in size.

Typically, the surface layer is brown silt loam about 5 inches thick. The next layer is dark yellowish brown silty clay loam to a depth of about 18 inches. The next layer is light brownish gray, mottled silt loam to a depth of about 23 inches. The next layer, a brittle fragipan, is dark yellowish brown and yellowish brown silt loam that extends to a depth of 62 inches. Below this is dark brown loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Calloway and Loring soils.

This soil is moderate in natural fertility and low in organic-matter content. The surface layer is medium acid to strongly acid, the subsoil is medium acid to very strongly acid, and the underlying material is strongly acid to neutral. Permeability is moderate above the fragipan and slow in the fragipan, and available water capacity is medium. The fragipan restricts the penetration of roots and the movement of water but does not seriously affect soil productivity or the choice of plants. Crops on this soil respond well to fertilization, and good tilth is easy to maintain.

This soil has fair potential for cultivated crops. Runoff is medium, and erosion is a hazard on long slopes. Clean-tilled crops that leave large amounts of residue can be grown year after year if the soil is cultivated on the contour and if long slopes are tilled across the slope. The principal crops are soybeans and cotton. Other crops are corn, grain sorghum, and winter small grain. Adapted pasture plants include bermudagrass, bahiagrass, tall fescue, and white clover.

This soil has good potential for cherrybark oak, loblolly pine, and sweetgum. There are no significant limitations in woodland use or management.

This soil has fair potential for dwellings, streets and roads, light industry, sewage lagoons, and sanitary landfills. Limitations for septic tank absorption fields are severe because of permeability and a seasonal water table perched above the fragipan.

This soil is in capability unit IIe-2. It is in woodland suitability group 3o7.

25—Henry silt loam. This level, poorly drained soil is on broad flats and in depressions. Slope is less than 1 percent. Individual areas range from 20 to several hundred acres in size.

Typically, the surface layer is grayish brown silt loam about 6 inches thick. The subsurface layer is gray, mottled silt loam to a depth of about 32 inches. The upper part of the subsoil is grayish brown, mottled silty clay loam to a depth of about 49 inches. The lower part is gray, mottled silty clay loam to a depth of about 72 inches. The underlying material is light brownish gray, mottled silt loam that extends to a depth of 84 inches or more.

Included with this soil in mapping are a few small areas of Amagon, Calhoun, and Hillemann soils.

This soil is moderate in natural fertility. Content of organic matter is low. The surface layer is medium acid to very strongly acid except where limed. The subsoil is medium acid to very strongly acid, and the underlying material is medium acid to mildly alkaline. Permeability is slow, and available water capacity is high. The water table is seasonally high; it is within 18 inches of the surface during winter and early spring.

This soil has fair potential for row crops and small grain and good potential for rice. Farming operations can be delayed several days after rain because of excess water; surface drains are needed in many places. The main crop is soybeans. Other suitable crops are cotton, rice, and grain sorghum. Winter small grain can be grown where surface drainage is adequate. Adapted pasture plants include bermudagrass and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for cherrybark oak, water oak, sweetgum, and Nuttall oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIw-2. It is in woodland suitability group 3w9.

26—Hillemann silt loam. This level, somewhat poorly drained soil is on broad flats. Slope is generally less than 1 percent. Individual areas range from 40 to 1,500 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer is light brownish gray, mottled silt loam to a depth of about 16 inches. The upper part of the subsoil is grayish brown and light brownish gray, mottled silty clay loam to a depth of about 40 inches. The lower part is light brownish gray, mottled silt loam to a depth of about 53 inches. The underlying material is light brownish gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Calhoun, Henry, and Jackport soils and a few areas of soils having slopes of as much as 2 percent.

This soil is moderate in natural fertility. Content of organic matter is low. The surface layer is medium acid to strongly acid except where limed. The subsoil is slightly acid to medium acid, and the underlying material is slightly acid to neutral. Permeability is very slow, and available water capacity is medium. The water table is seasonally high; it is within 12 inches of the surface during winter and early in spring.

This soil has fair potential for row crops and small grain and good potential for rice. Farming operations can be delayed several days after a rain because of excess water; surface drains are needed in many places. The main crops are rice and soybeans. Other suitable crops are cotton (fig. 7) and grain sorghum. Winter small grain can be grown where surface drainage is adequate. Adapted pasture plants include bermudagrass and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil. This soil has a high content of sodium and magnesium in the subsoil, generally within 22 to 36 inches of the surface. Land grading is hazardous because the high concentration of sodium and magnesium is toxic to many plants. Depth to the sodium-affected layer should be determined before cuts are made. If sodium-affected material is brought too near the surface, productivity may be severely impaired.

This soil has fair potential for water oak and sweetgum. Wetness is the main limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Very slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIw-2. It is in woodland suitability group 3w2.

27—Jackport silty clay loam. This level, poorly drained soil is on broad flats that were backswamps of former streams. Slope is less than 1 percent. Individual areas range from about 20 to more than 1,000 acres in size.

Typically, the surface layer is dark grayish brown, mottled silty clay loam about 6 inches thick. The subsurface layer is light brownish gray silty clay loam to a depth of about 12 inches. The upper part of the subsoil is grayish brown silty clay to a depth of about 23 inches. The middle part is grayish brown clay to a depth of about 37 inches. The lower part is dark grayish brown, mottled clay to a depth of about 49 inches. The underlying material is dark grayish brown silty clay and light brownish gray silty clay loam that extend to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Amagon, Foley, and Fountain soils and a few short breaks of soils having slope of 1 to 3 percent.

This soil is moderate in natural fertility. Content of organic matter is medium to low. The surface layer is medium acid to very strongly acid, the subsoil is very strongly acid to mildly alkaline, and the underlying material is slightly acid to mildly alkaline. Permeability is very slow, and available water capacity is high. The water table is seasonally high; it is within 12 inches of the surface during winter and early spring. This soil shrinks and cracks when dry, and these cracks seal when wet.

This soil has good potential for rice. It has fair potential for row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. The main crops are soybeans and rice. Other suitable crops are cotton and grain sorghum. Adapted pasture plants are bermudagrass, tall fescue, and white clover. Crops on this soil respond well to fertilization. Tilth is difficult to maintain because of clay content in the surface layer; clods form on the surface if the soil is plowed when wet.

This soil has good potential for water oak, willow oak, green ash, and sweetgum. Wetness is the main limitation to equipment use in managing and harvesting the tree

crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Wetness and shrink-swell potential are severe limitations for dwellings, streets, and industrial sites. The very slow permeability and the seasonal high water table are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIw-3. It is in woodland suitability group 2w6.

28—Lafe silt loam. This level, somewhat poorly drained soil is on narrow flats of loessial and fluvial terraces. Slope is less than 1 percent. Individual areas range from about 10 to 100 acres in size.

Typically, the surface layer is brown silt loam about 10 inches thick. The upper part of the subsoil is pale brown, mottled silty clay loam to a depth of about 35 inches. The lower part is light brownish gray, mottled silty clay loam to a depth of about 50 inches. The underlying material is light brownish gray and light gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Calhoun, Foley, and Fountain soils.

This soil is low in natural fertility. Content of organic matter is low. The surface layer is strongly acid to neutral, the subsoil is mildly alkaline to strongly alkaline, and the underlying material is moderately alkaline or strongly alkaline. Permeability is very slow, and available water capacity is medium. Sodium and magnesium, at levels toxic to many plants, are present within 3 to 12 inches of the surface.

Lafe silt loam has poor potential for row crops (fig. 8) because of droughtiness and high concentration of sodium and magnesium in the subsoil. Land grading is hazardous because of the high content of sodium and magnesium in the subsoil. Depth to the sodium-affected layers should be determined before cuts are made. Farming operations are commonly delayed several days after a rain because of excess water.

Lafe soil is not suited to the production of major commercial wood products because of droughtiness and the high concentration of sodium and magnesium in the subsoil. Post oak is the dominant tree on this soil.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings, streets, industrial sites, septic tank absorption fields, and sanitary landfills. These limitations are difficult to overcome.

This soil is in capability unit VIs-1. It is not assigned to a woodland suitability group.

29—Loring silt loam, 1 to 3 percent slopes. This moderately well drained, nearly level soil is on uplands of Crowleys Ridge. Individual areas range from 10 to 100 acres in size.

Typically, the surface layer is brown silt loam about 2 inches thick. The upper part of the subsoil is brown and strong brown silty clay loam to a depth of about 28 inches. The lower part is a brittle fragipan of brown, mottled silty clay loam that extends to a depth of about 72 inches or more.

Included with this soil in mapping are small areas of Calloway, Grenada, and Memphis soils.

This soil is moderate in natural fertility and low in organic-matter content. The surface layer and subsoil are strongly acid to medium acid. Permeability is moderately slow, and available water capacity is medium. The fragipan restricts the penetration of roots and the movement of water but does not seriously affect soil productivity or the choice of plants. Crops on this soil respond well to fertilization, and good tilth is easy to maintain.

This soil has fair potential for cultivated crops. Runoff is medium, and erosion is a hazard on long slopes. Clean-tilled crops that leave large amounts of residue can be grown year after year if contour cultivation, cross-slope farming, and other good management is used. The principal crops are soybeans and cotton. Other crops are grain sorghum and winter small grain. Adapted pasture plants include bahiagrass, bermudagrass, tall fescue, annual lespedeza, and white clover.

This soil has good potential for cherrybark oak, loblolly pine, and sweetgum. There are no significant limitations in woodland use or management.

This soil has fair potential for dwellings, streets and roads, light industry, sewage lagoons, and sanitary landfills. Limitations are severe for septic tank absorption fields because of the moderately slow permeability of the fragipan.

This soil is in capability unit IIe-2. It is in woodland suitability group 3o7.

30—Loring silt loam, 3 to 8 percent slopes. This moderately well drained, gently sloping soil is on uplands of Crowleys Ridge. Individual areas range from about 10 to 200 acres in size.

Typically, the surface layer is brown silt loam about 2 inches thick. The upper part of the subsoil is brown and strong brown silty clay loam to a depth of about 28 inches. The lower part is a brittle fragipan of brown, mottled silty clay loam that extends to a depth of about 72 inches or more.

Included with this soil in mapping are small areas of Memphis and Grenada soils and small areas of shallow gullies.

This soil is moderate in natural fertility and low in organic-matter content. The surface layer and subsoil are strongly acid to medium acid. Permeability is moderately slow, and available water capacity is medium. The fragipan restricts the penetration of roots and the movement of water but does not seriously affect soil productivity or the choice of plants.

This soil has fair potential for cultivated crops. Runoff is medium to rapid, and erosion is a hazard. Under good management that includes contour cultivation and cross-slope farming, sown crops that leave large amounts of residue can be safely grown year after year. Clean-tilled crops can be grown most years if the cropping system

includes a sod crop or a winter cover crop. Conservation practices need to be intensified as slope length and gradient increase. The surface of this soil puddles and crusts readily after a rain because of the low content of organic matter and the weak structure of the soil material. Cultivated crops are mostly winter small grain. This soil has good potential for pasture. Adapted pasture plants include bermudagrass, bahiagrass, tall fescue, annual lespedeza, and white clover.

This soil has good potential for sweetgum, cherrybark oak, and loblolly pine. There are no significant limitations in woodland use and management.

This soil has fair potential for dwellings, streets and roads, light industry, sewage lagoons, and sanitary landfills. Limitations are severe for septic tank absorption fields because of the moderately slow permeability of the fragipan.

This soil is in capability unit IIIe-1. It is in woodland suitability group 3o7.

31—Loring silt loam, 8 to 12 percent slopes. This moderately well drained, moderately sloping soil is on uplands of Crowleys Ridge. Individual areas range from about 20 to more than 1,000 acres in size.

Typically, the surface layer is brown silt loam about 2 inches thick. The upper part of the subsoil is brown and strong brown silty clay loam to a depth of about 28 inches. The lower part is a brittle fragipan of brown, mottled silty clay loam that extends to a depth of about 72 inches or more.

Included with this soil in mapping are a few small areas of Memphis soils and a few gullied areas.

This soil is moderate to low in natural fertility and low in organic-matter content. The surface layer and subsoil are strongly acid to medium acid. Permeability is moderately slow, and available water capacity is medium. The fragipan restricts the penetration of roots and the movement of water.

This soil has poor potential for cultivated crops. Runoff is rapid, and erosion is a severe hazard. Small grain and other drilled crops can be safely grown occasionally if the cropping system includes close-growing cover crops most of the time. This soil has good potential for pasture (fig. 9). Suitable pasture plants include bermudagrass, bahiagrass, tall fescue, annual lespedeza, and white clover. Management concerns include proper stocking, controlled grazing, and weed and brush control.

This soil has good potential for loblolly pine, cherrybark oak, and sweetgum. There are no significant limitations in woodland use or management.

This soil has fair potential for dwellings, streets and roads, and sanitary landfills. Limitations are severe for light industry, septic tank absorption fields, and sewage lagoons because of slope, permeability, and the seasonal water table perched above the fragipan.

This soil is in capability unit IVe-1. It is in woodland suitability group 3o7.

32—Memphis silt loam, 12 to 40 percent slopes. This well drained, moderately steep and steep soil is on uplands of Crowleys Ridge. It is on side slopes and steeper ridgetops. These soils formed in thick deposits of loess. Individual areas range from about 10 to 1,000 acres in size.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsurface layer is brown silt loam to a depth of about 10 inches. The upper part of the subsoil is dark brown silt loam and silty clay loam to a depth of about 27 inches. The lower part is strong brown silty clay loam to a depth of about 56 inches. The underlying material is dark brown silty clay loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Loring, Brandon, and Saffell soils and a few gullied areas.

This soil is moderate to low in natural fertility and low in organic-matter content. Permeability is moderate, and available water capacity is high. The surface layer is medium acid to very strongly acid, and the subsoil and underlying material are strongly acid to very strongly acid.

This soil has poor potential for cultivated crops. Runoff is rapid, and erosion is a severe hazard. This soil has good potential for pasture. Suitable pasture plants include bermudagrass, bahiagrass, annual lespedeza, and tall fescue. Management concerns include proper stocking, controlled grazing, and weed and brush control.

This soil has good potential for loblolly pine, cherrybark oak, sweetgum, and yellow-poplar. Slope is the main limitation to equipment use and management.

This soil has poor potential for dwellings, streets and roads, and sanitary landfills. Limitations are severe for light industry, septic tank absorption fields, and sewage lagoons because of slope, runoff, and erosion.

This soil is in capability unit VIe-1. It is in woodland suitability group 2r8.

33—Memphis soils, 8 to 40 percent slopes, gullied. This undifferentiated group consists of well drained soils on Crowleys Ridge. These soils are on narrow ridgetops and the adjacent steep side slopes. Individual areas range from 10 to 1,000 acres in size. Individual areas of Memphis soils and closely associated soils are large enough to map separately, but because of present and predicted use, they were not separated in mapping. The pattern and proportion of soils are not uniform. Most areas have rills and shallow and deep gullies as much as 10 feet deep and 60 feet wide.

About 70 percent of the map unit is Memphis soils. Typically, the surface layer is dark brown silt loam about 2 inches thick. The subsurface layer is yellowish brown silt loam or silty clay loam to a depth of about 9 inches. The upper part of the subsoil is dark brown silt loam and silty clay loam to a depth of about 27 inches. The lower part is strong brown silty clay loam to a depth of about 56 inches. The underlying material is dark brown silty clay loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Loring, Brandon, and Saffell soils.

Memphis soils are medium acid to very strongly acid throughout. Permeability is moderate, and available water capacity is high.

These soils have poor potential for row crops and pasture because of moderately sloping to steep slopes and the severe hazard of erosion.

These soils have good potential for loblolly pine, sweetgum, and cherrybark oak. Slope and erosion hazard are the main limitations in equipment use and management.

These soils have poor potential for urban use. Slope and erosion hazard, the main limitations, are difficult to overcome.

This soil is in capability unit VIIe-1. It is in woodland suitability group 2r8.

34—Mhoon fine sandy loam. This level soil is in depressions on flood plains. Slope is less than 1 percent. Individual areas range from about 20 to 400 acres in size.

Typically, the surface layer is very dark grayish brown and dark gray fine sandy loam about 8 inches thick. The upper part of the subsoil is dark gray, mottled silty clay loam to a depth of about 19 inches. The lower part is gray, mottled silty clay loam to a depth of 54 inches. The underlying material is gray, mottled sandy clay loam that extends to a depth of 68 inches or more.

Included with this soil in mapping are a few areas of Commerce, Convent, Roellen, and Sharkey soils. Also included are small areas of soils that have a dark surface layer 6 to 10 inches thick.

This soil is moderate in natural fertility. Content of organic matter is low to medium. Permeability is slow, and available water capacity is high. The surface layer is slightly acid through mildly alkaline. The subsoil and underlying material are slightly acid to moderately alkaline. The water table is seasonally high; it is within 12 inches of the surface during winter and early spring.

This soil has fair potential for row crops. Excess water is a moderate hazard and can cause farming operations to be delayed several days after a rain. Surface drains are needed in most areas. The main crop is soybeans. Other suitable crops are cotton, rice, and grain sorghum. Winter small grain can be grown if surface drainage is adequate. Adapted pasture plants are bermudagrass and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for woodland. Some important trees are cherrybark oak, cottonwood, water oak, willow oak, and sweetgum. Wetness is a severe limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings, industrial sites, septic tank absorption fields, and streets and roads. This limitation is difficult to overcome.

This soil is in capability unit IIw-4. It is in woodland suitability group 1w6.

35—Mhoon soils, frequently flooded. This undifferentiated group consists of poorly drained soils on flood plains along the St. Francis River. It is inundated several times in most years. Slope is dominantly less than 1 percent. Individual areas range from about 80 to more than 1,000 acres in size. Individual areas of Mhoon soils and closely associated soils are large enough to map separately, but because of present and predicted use, they were not separated in mapping. The pattern and proportion of the soils are not uniform.

Typically, the surface layer is very dark grayish brown and dark gray, mottled silt loam about 8 inches thick. The upper part of the subsoil is dark gray, mottled silty clay loam to a depth of about 19 inches. The lower part is gray, mottled silty clay loam to a depth of about 54 inches. The underlying material is gray, mottled sandy clay loam to a depth of 68 inches or more.

Included with this soil in mapping are similar soils that have a dark surface layer 6 to 10 inches thick, and small areas of water.

These soils are slightly acid through mildly alkaline in the surface layer. The subsoil and underlying material are slightly acid to moderately alkaline. Permeability is slow, and available water capacity is high. The water table is seasonally high, and flooding is frequent during winter and early spring.

These soils have poor potential for farming because of the hazard of frequent flooding. In most years flooding occurs during the period December to June. Crops, such as soybeans or grain sorghum, that require a short growing season can be grown, but flooding is likely to damage the crop some years. Most of the area is within a State-owned game management area.

These soils are well suited to woodland. They have good potential for cottonwood, water oak, willow, cypress, water tupelo, Nuttall oak, and sweetgum. Wetness and flooding limit the use of equipment in managing and harvesting the tree crop, but this can be overcome by using special equipment and by logging during drier seasons.

These soils have very poor potential for urban use. Wetness and flooding, the main limitations, can be overcome only by major flood control and drainage measures.

This soil is in capability unit Vw-2. It is in woodland suitability group 1w6.

36—Roellen silty clay loam. This level to depressional soil is in stream channels, oxbows, or lakebeds of former streams. It is flooded commonly but less often than once every 2 years. Slope is less than 1 percent. Individual areas range from about 10 to 400 acres in size.

Typically, the surface layer is very dark grayish brown silty clay loam and very dark gray silty clay about 7 inches thick. The subsoil is dark gray, mottled silty clay to a depth of about 60 inches. The underlying material is dark gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Mhoon and Sharkey soils and a few small areas of soils that have a loam or silt loam surface layer.

This soil is high in natural fertility. Content of organic matter is medium. Permeability is very slow, and available water capacity is medium to high. Reaction ranges from medium acid to mildly alkaline throughout. The water table is seasonally high; it is within 12 inches of the surface during winter and early spring. This soil shrinks and cracks when dry, and these cracks seal when wet.

This soil has good potential for rice and fair potential for row crops. Farming operations are commonly delayed several days after a rain because of excess water, and surface drains are needed. The main crops are soybeans and rice. Other suitable crops are cotton and grain sorghum. Adapted pasture plants include bermudagrass and tall fescue. Crops on this soil respond well to fertilization. Tilth is difficult to maintain because of high clay content in the surface layer; clods form on the surface if the soil is plowed when wet.

This soil has good potential for woodland. Some important trees are cottonwood, cherrybark oak, sweetgum, and water oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop.

This soil has poor potential for most urban uses. Wetness, flooding, and shrink-swell potential are severe limitations for dwellings and industrial sites. The very slow permeability, flooding, and wetness are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIw-3. It is in woodland suitability group 2w6.

37—Sharkey clay. This level soil is on broad slack water flats. Slope is less than 1 percent. Individual areas range from about 20 to more than 400 acres in size.

Typically, the surface layer is very dark grayish brown clay about 5 inches thick. The subsoil, to a depth of about 60 inches, is dark gray, mottled clay and silty clay loam. The underlying material is dark gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few small areas of Commerce, Mhoon, and Roellen soils, and a few small areas of water. Also included are small areas of soils that contain less clay than Sharkey soils.

This soil is high in natural fertility. Content of organic matter is medium. Permeability is very slow, and available water capacity is high. Reaction ranges from medium acid to moderately alkaline in the surface layer and in the upper part of the subsoil. It is neutral in the lower part of the subsoil and in the underlying material. The water table is seasonally high; it is within 12 inches of the surface during winter and early spring. This soil shrinks and cracks when dry, and these cracks seal when wet.

This soil has good potential for rice. It has fair potential for row crops. Farming operations are commonly delayed several days after rain because of excess water, and surface drains are needed. The main crops are soybeans and rice. Other suitable crops are cotton and grain sorghum. Adapted pasture plants include bermudagrass and tall fescue. Crops on this soil respond well to fertilization. Tilth is difficult to maintain because of high clay content in the surface layer; clods form on the surface if the soil is plowed when wet.

This soil has good potential for woodland. Some important trees are cottonwood, cherrybark oak, sweetgum, and water oak. Wetness is the main limitation to equipment use in managing and harvesting the tree crop.

This soil has poor potential for most urban uses. Wetness and shrink-swell potential are severe limitations for dwellings, streets, and industrial sites. Very slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIw-3. It is in woodland suitability group 2w6.

38—Sharkey soils, frequently flooded. This undifferentiated group consists of poorly drained soils in slack water areas on flood plains along the St. Francis River. The map unit is made up of Sharkey clay and other Sharkey soils having variable surface textures. These soils do not occur in a regular pattern. Individual areas are large enough to map separately, but because of present and predicted use, they were not separated in mapping. Most mapped areas are in the St. Francis River Floodway. Natural flooding causes this area to be inundated several times in most years (fig. 10). Induced flooding, to provide waterfowl habitat, causes this area to be flooded from 4 to 6 months during fall, winter, and spring. Slope is dominantly less than 1 percent. Individual areas range from about 80 to several thousand acres in size.

Typically, the surface layer is very dark gray clay about 5 inches thick. The surface layer, however, ranges from silt loam to clay. The subsoil, to a depth of about 60 inches, is dark gray, mottled clay and silty clay loam. The underlying material is dark gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with these soils in mapping are a few small areas of Mhoon soils, a few small sandy areas, and a few small areas of water. Also included are small areas of soils that have a sandy loam surface layer.

These soils are high in natural fertility. Content of organic matter is medium. Permeability is very slow, and available water capacity is high. Reaction ranges from medium acid to moderately alkaline in the surface layer and in the upper part of the subsoil and from neutral to moderately alkaline in the underlying material. Flooding is frequent during winter and early spring.

These soils have poor potential for row crops and pasture because of the hazard of frequent flooding.

These soils have fair potential for woodland and good potential for wildlife habitat and are used mainly for these purposes. Some important trees are green ash, cottonwood, cypress, red maple, water tupelo, and water oak. Wetness and flooding limit the use of equipment in man-

aging and harvesting the tree crop, but these limitations can be overcome by using special equipment and by harvesting during drier seasons.

These soils have very poor potential for urban uses because of wetness and flooding.

This soil is in capability unit Vw-1. It is in woodland suitability group 3w6.

39—Tichnor silt loam. This level soil is in drainageways on uplands. It formed in silty sediments derived from loess. It is flooded commonly but less often than once every 2 years. Slope is less than 1 percent. Individual areas range from about 10 to more than 200 acres in size.

Typically, the surface layer is grayish brown silt loam about 4 inches thick. The subsurface layer is gray, mottled silt loam to a depth of about 32 inches. The subsoil is light gray, mottled silty clay loam and silt loam to a depth of about 59 inches. The underlying material is light gray, mottled silt loam that extends to a depth of 72 inches or more.

Included with this soil in mapping are a few areas of Calhoun and Falaya soils and small areas of soils that are frequently flooded.

This soil is moderate in natural fertility. Content of organic matter is low. Permeability is slow, and available water capacity is medium to high. The reaction of the surface layer, subsurface layer, and subsoil ranges from very strongly acid to medium acid except where limed. The underlying material ranges from strongly acid to neutral. The water table is seasonally high; it is within 12 inches of the surface during winter and early spring.

This soil has fair potential for row crops. Farming operations are commonly delayed several days after rain because of excess water, and surface drains are needed. The main crop is soybeans. Other suitable crops are rice and grain sorghum. Adapted pasture plants include bermudagrass and tall fescue. Crops on this soil respond well to fertilization, and tilth is easy to maintain by returning crop residue to the soil.

This soil has good potential for woodland. Some important trees are cottonwood, sweetgum, water oak, and willow oak. Wetness is a limitation to equipment use in managing and harvesting the tree crop, but this limitation is usually overcome by logging during the drier seasons.

This soil has poor potential for most urban uses. Wetness is a severe limitation for dwellings, streets, and industrial sites. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult to overcome.

This soil is in capability unit IIIw-1. It is in woodland suitability group 1w6.

40—Udorthents. This map unit consists of gravel pits, abandoned pits, and ridges and piles of excavated material. The pits are open excavations from which soil and underlying material have been removed. Slope ranges from 8 to 40 percent. Individual areas are about 10 to 50 acres in size.

This map unit is about 50 percent gravel pits still being mined. About 40 percent is areas of ridges and piles of excavated material and a few areas that have been smoothed. The remaining 10 percent is small areas of Brandon and Saffell soils.

Udorthents consist of soils that have been altered or obscured by mining operations. The soil material ranges from dark grayish brown silt loam to yellowish red very gravelly sandy clay loam.

Soils in this map unit have moderate to moderately rapid permeability. Fertility and organic matter content are low. Available water capacity is low. These soils are strongly acid or very strongly acid.

This map unit has poor potential for cultivated crops. Slopes are moderate to steep, runoff is rapid, and the hazard of erosion is very severe. A few small areas have been smoothed and seeded to introduced or native grasses or planted to trees. Management concerns are weed and brush control.

This map unit has medium potential for loblolly pine and redcedar and poor potential for hardwoods. Pine trees planted in some areas have a fair survival rate. Slope, erosion hazard, and droughtiness are limitations in woodland use and management.

Udorthents have poor potential for most urban uses. Where slope is 8 to 15 percent, limitations are moderate for dwellings, roads and streets, and septic tank absorption fields. Where slope is more than 15 percent, limitations are severe for these uses.

This map unit is not assigned to a capability unit or a woodland suitability group.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic tank disposal systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture and woodland; as sites for buildings, highways and other transportation systems, sanitary facilities, and parks and other recreation facilities; and for wildlife habitat. From the data presented, the potential of each soil for specified land uses can be

determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

Wilson Ferguson, conservation agronomist, Soil Conservation Service, helped prepare this section.

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the predicted yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the management practices that are needed. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Soil maps for detailed planning." Planners of management systems for individual fields or farms, should also consider the detailed information given in the description of each soil.

More than 315,461 acres in the survey area was used for crops and pasture in 1974, according to the Census of Agriculture. Of this total, 288,009 acres was harvested cropland (see Table 1 for principal crops harvested).

The soils in Craighead County have good potential for increased production of food. Food production could be increased considerably by extending the latest crop production technology to all cropland in the survey area. This soil survey can help facilitate the application of such technology.

Acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development. The use of this soil survey to help make land use decisions that will influence the future role of farming in the survey area is discussed in the section "General soil map for broad land use planning."

Contour cultivation, terraces, vegetated waterways, or combinations of these erosion control treatments are needed on sloping soils that are used for clean-tilled crops. Row arrangement and suitable surface drainage are needed for dependable growth in wet areas. Many tracts that are subject to frequent flooding are unsuited, or only marginally suited, to most crops commonly grown in the county.

Annual cover crops or grasses and legumes should be grown regularly in the cropping system if the erosion hazard is severe or if the crops grown leave only small amounts of residue. Seedbed preparation should be delayed until spring to secure maximum benefit from residue. Crop residue should be shredded and spread evenly to provide protective cover and active organic matter to the soils.

A plowpan commonly develops in loamy soils that are improperly tilled or that are tilled frequently with heavy equipment. Keeping tillage to a minimum, varying the depth of tillage, and tilling when soil moisture content is favorable help prevent formation of a plowpan. Growing deep-rooted grasses and legumes in the cropping system helps break up plowpans.

If left bare, many soils tend to puddle, pack, and crust during periods of heavy rainfall. Growing cover crops and managing crop residue help preserve or improve tilth.

Perennial grasses or legumes, or mixtures of these, are grown for pasture and hay. The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume.

Coastal bermudagrass and common bermudagrass are the summer perennials most commonly grown. Coastal bermudagrass and Pensacolagrass are fairly new to this county but produce good-quality forage. Tall fescue, the chief winter perennial grass now grown in the county, grows well only on soils that have a favorable soil-moisture relationship. All of these grasses respond well to fertilizer, particularly nitrogen. White clover, crimson clover, annual lespedeza, and sericea lespedeza are the most commonly grown legumes.

Proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Other treatments and management practices such as brush and weed control, fertilization, and renovation of the pasture are also important.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are

shown in table 7. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 7.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 7 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forest trees, or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability unit is identified in the description of each soil map unit in the section "Soil maps for detailed planning." Capability units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-2 or IIIw-1.

Woodland management and productivity

James T. Beene, forester, Soil Conservation Service, helped prepare this section.

When the first settlers arrived in Craighead County, virgin forest covered all the land area except river sandbars and scattered small patches where the Indians grew such crops as corn, beans, and squash.

In the lowlands, the principal tree species were sweetgum, water tupelo, baldcypress, bottom land oaks, sycamore, cottonwood, and pecan. On the uplands and loess plains were yellow-poplar, beech, black walnut, butternut, cucumbertree, black oak, white oak, hickory, and ash.

Woodland makes up about 45,500 acres, or about 10 percent (*8*) of the land area in Craighead county. In recent years, there has been a trend to convert several hundred acres each year from woodland to cropland. It is expected that this trend will continue, but at a gradually reduced rate.

Table 8 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Map unit symbols for soils suitable for wood crops are listed, and the woodland suitability group symbol for each soil is given. All soils bearing the same woodland suitability group symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *woodland suitability group*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: x, w, t, d, c, s, f, and r.

The third element in the symbol, a numeral, indicates the kind of trees for which the soils in the group are best suited and also indicates the severity of the hazard or limitation. The numerals 1, 2, and 3 indicate slight, moderate, and severe limitations, respectively, and suitability for needleleaf trees. The numerals 4, 5, and 6 indicate slight, moderate, and severe limitations, respectively, and suitability for broadleaf trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and suitability for both needleleaf and broadleaf trees.

In table 8 the soils are also rated for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings. Plant competition is not considered in the ratings. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *important trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Important trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Engineering

James L. Janski, civil engineer, Soil Conservation Service, helped prepare this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bed-

rock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 9 shows, for each kind of soil, the degree and kind of limitations for building site development; table 10, for sanitary facilities; and table 12, for water management. Table 11 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 9. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 9 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 9 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 10 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which, respectively, mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 10 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of

stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to wind erosion.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 11 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 15 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 11 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 15.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 12 the degree of soil limitation and soil and site features that affect use are indicated for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and

site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and wind erosion, texture, presence of salts and alkali, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, wind erosion, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 13 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 10, and interpretations for dwellings without basements and for local roads and streets, given in table 9.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Wildlife habitat

Roy A. Grizzell, Jr., biologist, Soil Conservation Service, helped prepare this section.

Soils are related to the kinds and abundance of wildlife through the vegetation they support and the habitat the vegetation provides. Desirable habitat depends on the diversity of food, cover, and nearness of vegetation to water. The kinds and amount of vegetation are closely related to soil characteristics and land use.

All wildlife and fish respond to the basic characteristics of soils. This response is affected in many ways by fertility, slope, wetness, and other characteristics of soils. The permeability rate determines whether or not the soil can be used to impound water in ponds and lakes.

Extensive wooded areas, such as those in the St. Francis River Floodway, are well suited as habitat for deer, wild turkey, squirrel, and other woodland wildlife. These areas and similar ones on private land provide suitable food, cover, and drinking water for wildlife, if they are not unduly disturbed.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, is inadequate, or is inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 14, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submerged or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control structures in marshes or streams. Major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs,

shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants.

Wetland habitat consists of open, marshy or swampy, shallow water areas where water-tolerant plants grow.

Soil properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features.

Engineering properties

Table 15 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 15 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil series and morphology."

Texture is described in table 15 in the standard terms used by the U.S. Department of Agriculture (*7*). These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The estimated classification, without group index numbers, is given in table 15. Also in table 15 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in

liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 16 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 17 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist

chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snowmelts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Soil series and morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil that is typical of the soil series in the survey area, is described. The detailed descriptions of each soil horizon follow standards in the Soil Survey Manual (*7*). Unless otherwise noted, colors described are for moist soil.

Following the pedon description is the range of important characteristics of the soil series in this survey area. Phases, or map units, of each soil series are described in the section "Soil maps for detailed planning."

Amagon series

The Amagon series consists of poorly drained, slowly permeable soils that formed in beds of loamy sediments. These soils are on broad flats on the lower parts of old natural levees and in shallow depressions along natural drainageways. They are saturated with water in late winter and early spring. The native vegetation is hardwood forest, mainly water-tolerant species of oak. Slope is dominantly less than 1 percent.

Amagon soils are geographically associated with Beulah, Commerce, Calhoun, Dundee, Foley, Dubbs, Fountain, and Jackport soils. Beulah, Commerce, and Dubbs soils, which are on higher parts of natural levees, are better drained than Amagon soils. Dundee soils, which are on slightly higher parts of natural levees bordering abandoned stream channels, are also better drained. Foley, Calhoun, and Fountain soils, which are on broad flats, have tongues of the A2 horizon extending into the B horizon. Foley soils also have high sodium content in the B horizon. Jackport soils, which are on broad flats in slack water areas, have a very fine control section.

Typical pedon of Amagon silt loam, in a cultivated area in the SW1/4NE1/4NW1/4 sec. 32, T. 13 N., R. 5 E.:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; few fine roots; few small dark concretions; very strongly acid; abrupt smooth boundary.

A21g—8 to 14 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct yellowish brown mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; few small dark concretions; very strongly acid; clear wavy boundary.

A22g—14 to 17 inches; gray (10YR 6/1) silt loam; common medium distinct dark yellowish brown (10YR

3/4) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few hard dark concretions in the lower part; very strongly acid; clear wavy boundary.

B21tg—17 to 25 inches; light brownish gray (10YR 6/2) silty clay loam; common medium and fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common medium pores; patchy clay films on faces of peds and in pores; gray silt coats between some peds; few fine roots; few fine dark hard concretions; very strongly acid; clear wavy boundary.

B22tg—25 to 37 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few patchy clay films on faces of peds; few dark hard concretions; very strongly acid; clear wavy boundary.

B23tg—37 to 48 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm; few patchy clay films on faces of peds; sand grains coated; few dark hard concretions; very strongly acid; clear wavy boundary.

B3g—48 to 60 inches; light brownish gray (2.5Y 6/2) loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; strongly acid; clear wavy boundary.

Cg—60 to 72 inches; light brownish gray (10YR 6/2) loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; firm; medium acid.

Solum thickness ranges from 50 to 70 inches or more. Reaction ranges from very strongly acid to medium acid in the A and B horizons and from strongly acid to mildly alkaline in the C horizon.

The A horizon is dominantly less than 15 inches thick but ranges to as much as 20 inches in thickness. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2. The A2g horizon has hue of 10YR, value of 6, and chroma of 1 or 2. The A horizon is silt loam or fine sandy loam.

The B2tg horizon has hue of 10YR, value of 6, and chroma of 1 or 2, or it has hue of 2.5Y, value of 5 or 6, and chroma of 2. Texture is silt loam or silty clay loam. Few to common fine or medium yellow, brown, and gray mottles are throughout the horizon. The B3 horizon has hue of 10YR or 2.5Y, value of 5, 6, or 7, and chroma of 1 or 2. Texture is loam, silt loam, or silty clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Texture is silty clay loam, silt loam, or loam. Medium-sized brown and yellow mottles and small pockets or veins of light gray silt are common.

Beulah series

The Beulah series consists of somewhat excessively drained, moderately rapidly permeable soils that formed in sandy sediments on natural levees bordering streams and former stream channels. These soils are level and gently undulating. Slope is 0 to 3 percent.

Beulah soils are geographically associated with Amagon, Bruno, Dubbs, and Dundee soils. Amagon soils, which are on broad flats on the lower parts of natural levees, are grayer and more poorly drained than Beulah soils. Bruno soils, which are on lower parts of natural levees and on flood plains, have coarser textures in the 10- to 40-inch control section. Dubbs and Dundee soils, which are on lower parts of natural levees, are not so permeable and have a fine-silty control section; in addition, Dundee soils have lower chroma.

Typical pedon of Beulah fine sandy loam, gently undulating, in a cultivated area in the NE1/4NW1/4NE1/4 sec. 22, T. 15 N., R. 6 E.:

Ap—0 to 8 inches; brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; few fine roots; strongly acid; abrupt smooth boundary.

B21—8 to 20 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; common pores; strongly acid; clear wavy boundary.

B22—20 to 40 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium and fine subangular blocky structure; very friable; few fine roots; common pores; strongly acid; gradual wavy boundary.

B23—40 to 50 inches; yellowish brown (10YR 5/4) fine sandy loam; weak medium and fine subangular blocky structure; very friable; few thin brown horizontal lines in lower part; strongly acid; clear wavy boundary.

C—50 to 72 inches; yellowish brown (10YR 5/4) loamy sand; few medium distinct pale brown (10YR 6/3) and few medium faint yellowish brown (10YR 5/6) mottles; single grain; very friable to loose; medium acid.

Solum thickness ranges from about 24 to 50 inches. Reaction ranges from strongly acid through medium acid in the A horizon except where limed, from strongly acid through medium acid in the B horizon, and from medium acid to neutral in the C horizon.

The A horizon is less than 10 inches thick in most pedons. It has hue of 10YR with value of 4 and chroma of 2 or 3, or with value of 5 and chroma of 3.

The B horizon has hue of 10YR, value of 4, 5, or 6, and chroma of 4, or it has hue of 7.5YR, value of 4, and chroma of 4. Texture ranges from fine sandy loam through loam.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Texture is fine sandy loam or loamy sand.

Brandon series

The Brandon series consists of well drained, moderately permeable, moderately sloping and moderately steep soils on uplands of Crowleys Ridge. These soils formed in moderately thick deposits of wind-laid sediments and in the underlying gravelly water-laid sediments. Slope is 8 to 20 percent. The natural vegetation was hardwood trees.

Brandon soils are geographically associated with Loring, Memphis, and Saffell soils. Loring and Memphis soils, which are on nearly level to moderately steep uplands, formed in thick loess and have base saturation of more than 35 percent at a depth of 50 inches below the upper boundary of the argillic horizon. Loring soils also have a fragipan. Saffell soils, which are on lower sides of uplands, formed in predominantly gravelly, loamy water-laid material similar to the underlying material of Brandon soils.

Typical pedon of Brandon silt loam, in an area of Brandon-Saffell association, moderately sloping, in a wooded area in the NE1/4SE1/4NE1/4 sec. 3, T. 13 N., R. 3 E.:

A1—0 to 1 inch; dark grayish brown (10YR 4/2) silt loam; weak fine to medium granular structure; many medium roots; very strongly acid; abrupt smooth boundary.

A2—1 to 5 inches; brown (10YR 5/3) silt loam; weak fine and medium granular structure; friable; common medium roots; very strongly acid; clear wavy boundary.

B21t—5 to 20 inches; yellowish red (5YR 4/6) silty clay loam; weak fine and medium subangular blocky structure; friable; common fine roots; few patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B22t—20 to 39 inches; yellowish red (5YR 4/6) silty clay loam; weak medium to fine subangular and angular blocky structure; friable; few fine roots; common patchy clay films on faces of peds; 10 percent of volume is rounded and angular gravel as much as 2 inches in diameter; light brownish gray and pale brown coatings surround roots and old root channels; very strongly acid; gradual wavy boundary.

IIC1—39 to 58 inches; yellowish red (5YR 4/6) very gravelly sandy clay loam; massive; hard and cemented in place; 65 percent of volume is rounded and angular gravel up to 2 inches in diameter; very strongly acid; gradual wavy boundary.

IIC2—58 to 72 inches; yellowish red (5YR 4/8) gravelly sandy clay loam; massive; firm; 35 percent rounded and angular gravel up to 2 inches in diameter; very strongly acid.

Solum thickness ranges from 24 to 40 inches. Reaction is strongly acid or very strongly acid throughout the profile, except for the surface layer where limed.

The A horizon is dominantly less than 10 inches thick but ranges up to 12 inches in thickness. The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Some pedons have a thin A1 horizon having darker chroma than the Ap horizon.

The B horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 or 6. Texture is silty clay loam or silt loam.

The IIC horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. Gravel content is 30 to 75 percent, and the fine earth texture is silt loam, loam, clay loam, fine sandy loam, or sandy clay loam.

Bruno series

The Bruno series consists of excessively drained, rapidly permeable, level soils that formed in stratified loamy and sandy sediments. These soils are on flood plains, commonly on natural levees along streams and abandoned stream channels. The natural vegetation is hardwood trees. Slope is dominantly less than 1 percent.

Bruno soils are geographically associated with Dubbs, Dundee, Commerce, and Beulah soils. Dubbs, Dundee, and Commerce soils, which are on natural levees bordering streams or former stream channels, have more clay in the B horizon. Also, Dubbs soils are well drained and Dundee soils are somewhat poorly drained. Beulah soils, which are on slightly higher parts of levees, have textures finer than sand or loamy sand in the 10- to 40-inch control section. Beulah soils are not so excessively drained as Bruno soils.

Typical pedon of Bruno loamy sand, in a cultivated area of Dundee-Bruno-Commerce complex in the SE1/4SW1/4SW1/4 sec. 5, T. 14 N., R. 7 E.:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) loamy sand; weak medium granular structure; very friable; few fine roots; slightly acid; abrupt smooth boundary.

C1—10 to 17 inches; dark yellowish brown (10YR 4/4) loamy sand; single grain; loose; few fine roots; mildly alkaline; clear wavy boundary.

C2—17 to 35 inches; light brownish gray (10YR 6/2) loamy sand; few medium distinct yellowish brown (10YR 5/6) mottles; single grain; loose; 1-inch band of fine sandy loam at a depth of 28 to 29 inches; few fine roots; mildly alkaline; clear wavy boundary.

C3—35 to 45 inches; brown (10YR 5/3) loamy sand; few medium distinct yellowish brown (10YR 5/6) mottles; single grain; loose; organic debris; mildly alkaline; clear smooth boundary.

C4—45 to 48 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct dark brown (10YR 4/3) mottles; thin bedding planes; massive; friable; mildly alkaline; abrupt smooth boundary.

C5—48 to 55 inches; light brownish gray (10YR 6/2) fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; massive; friable; mildly alkaline; clear smooth boundary.

C6—55 to 72 inches; pale brown (10YR 6/3) fine sandy loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; common brown concretions; mildly alkaline.

The soil ranges from strongly acid through mildly alkaline throughout the profile.

The A horizon ranges from 10 to 24 inches in thickness in most pedons. It has hue of 10YR with value of 3, 4, or 5 and chroma of 3, or with value of 4 and chroma of 2.

The C horizon has hue of 10YR, value of 4, 5, or 6, and chroma of 2 or 3; hue of 2.5Y, value of 4, 5, or 6, and chroma of 2; or hue of 10YR, value of 4, and chroma of 4. The 10- to 40-inch control section is dominantly sand or loamy sand and contains thin strata of loamy very fine sand, silt loam, fine sandy loam, or finer textured material. Thin bedding planes are evident in some pedons, sometimes with accumulations of organic debris.

Calhoun series

The Calhoun series consists of poorly drained, slowly permeable soils that formed in loesslike material. These soils are on broad flats and in depressions on terraces. They are saturated with water in late winter and early spring. The native vegetation was mixed hardwoods. Slope is dominantly less than 1 percent.

Calhoun soils are geographicaly associated with Amagon, Foley, Fountain, Henry, Calloway, Hillemann, Lafe, and Tichnor soils. Amagon soils, which are on the lower parts of old natural levees, lack tonguing of the A2 horizon into the B horizon. Fountain and Foley soils, which are on broad flats, have tongues of the A2 horizon extending into the B horizon; in addition, Foley soils have a natric horizon. Henry soils, which are on broad flats and in depressions on uplands, are deeper to the clayey horizons and also have a fragipan. Calloway and Hillemann soils, which are on broad flats on uplands and terraces, are better drained than Calhoun soils and lack tonguing of the A2 horizon into the B horizon. Lafe soils, which are on narrow flats of loessial and fluvial terraces, are better drained than Calhoun soils and have a natric horizon. Tichnor soils, which are on upland drainageways, formed from material washed from loess and have an A horizon more than 24 inches thick.

Typical pedon of Calhoun silt loam, in a cultivated area in the NE1/4SW1/4NE1/4 sec. 18, T. 13 N., R. 2 E.:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; many fine roots; strongly acid; abrupt smooth boundary.

A21g—6 to 14 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct brown (10YR 4/3) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common dark concretions; very strongly acid; clear wavy boundary.

A22g—14 to 23 inches; light gray (10YR 7/2) silt loam; common medium and fine distinct light olive brown (2.5Y 5/4) mottles; medium subangular blocky structure; friable; few fine roots; few dark concretions; very strongly acid; clear wavy boundary.

B21tg—23 to 35 inches; grayish brown (2.5Y 5/2) silt loam; common fine distinct yellowish brown mottles; moderate medium subangular blocky structure; firm; few fine roots; tongues of white (10YR 8/1) silt as much as 1 inch wide extend through horizon; patchy clay films and gray silt coatings on faces of peds; very strongly acid; clear wavy boundary.

B22tg—35 to 45 inches; grayish brown (2.5Y 5/2) silty clay loam; few medium distinct light olive brown (2.5Y 5/6) mottles; moderate medium subangular blocky structure; few gray tongues; firm; thin light gray silty coatings around some peds; patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B3g—45 to 53 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct dark yellowish brown (10YR 3/4) mottles; moderate medium subangular blocky structure; firm; few old root channels; few fine white salt crystals; very strongly acid; clear wavy boundary.

C1g—53 to 64 inches; light brownish gray (2.5Y 6/2) silt loam; few fine distinct light grayish brown and dark grayish brown mottles; massive; friable; very strongly acid; clear wavy boundary.

C2g—64 to 72 inches; light brownish gray (2.5Y 6/2) silt loam; common medium prominent strong brown (7.5YR 5/6) and few fine distinct dark brown and light gray mottles; massive; firm; few fine salt crystals; few black veins; very strongly acid.

Solum thickness ranges from 40 to 70 inches or more. Reaction ranges from very strongly acid to medium acid in the A horizon, from very strongly acid to neutral in the B horizon, and from very strongly acid to mildly alkaline in the C horizon.

The A horizon ranges from 10 to 24 inches in thickness. The Ap horizon has hue of 10YR with value of 4 or 5 and chroma of 2, or with value of 4 and chroma of 3. The A2g horizon has hue of 10YR, value of 5, 6, or 7, and chroma of 2.

The B horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2, or it has hue of 2.5Y, value of 5 or 6, and chroma of 2. Texture is silt loam or silty clay loam. Few to common fine yellow, brown, or gray mottles are throughout the horizon.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2, or it has hue of 2.5Y, value of 6, and chroma of 2.

Calloway series

The Calloway series consists of somewhat poorly drained, slowly permeable, level and nearly level soils on

uplands. These soils formed in thick deposits of loess. A fragipan restricts the penetration of roots and the movement of water. The native vegetation is mixed hardwoods. Slope is 0 to 3 percent.

Calloway soils are geographically associated with Loring, Grenada, Henry, and Calhoun soils. Loring and Grenada soils, which are on uplands, are better drained than Calloway soils. Henry and Calhoun soils, which are on broad flats and in depressions, are more poorly drained. In addition, Calhoun soils have tongues of the A2 horizon extending into the B horizon and lack a fragipan.

Typical pedon of Calloway silt loam, 1 to 3 percent slopes, in a cultivated area in the NE1/4SW1/4NE1/4 sec. 17, T. 15 N., R. 3 E.:

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak medium granular structure; friable; common fine roots; few fine pores; medium acid; abrupt smooth boundary.

B2—6 to 17 inches; light yellowish brown (10YR 6/4) silt loam; common medium distinct brownish yellow (10YR 6/6) and light brownish gray (10YR 6/2) mottles; weak fine and medium subangular blocky structure; friable; few fine roots; few fine dark concretions; few fine pores; strongly acid; clear wavy boundary.

A'2—17 to 28 inches; light brownish gray (10YR 6/2) silt loam; common fine and medium distinct brownish yellow (10YR 6/6), very pale brown (10YR 7/3), and light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; slightly compact; few fine roots; few fine dark concretions; few fine pores; strongly acid; gradual wavy boundary.

B'x1—28 to 41 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/4) and brownish yellow (10YR 6/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; compact and brittle; few clay films on faces of peds and in pores; black coatings and veins on some peds; thick friable light gray (10YR 7/2) silt coatings on faces of prisms and faces of peds; common dark concretions; few fine voids; strongly acid; gradual wavy boundary.

B'x2—41 to 52 inches; mottled yellowish brown (10YR 5/4), light brownish gray (10YR 6/2), and light yellowish brown (10YR 6/4) silt loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; compact and brittle; patchy clay films on faces of peds and in pores; common pores; friable; light gray (10YR 7/2) silty material on prisms and faces of peds; common brown and black concretions; strongly acid; clear wavy boundary.

B'x3—52 to 66 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct dark yellowish brown (10YR 4/4) and brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; friable; slightly compact; brittle; patchy clay films on ped faces and in pores; strongly acid; clear wavy boundary.

B3—66 to 72 inches; mottled pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) silt loam; weak medium subangular blocky structure; somewhat firm; few dark concretions; strongly acid.

Solum thickness exceeds 60 inches. Reaction ranges from medium acid through very strongly acid in the upper part of the solum. The lower part of the solum ranges from strongly acid to mildly alkaline.

The Ap horizon has hue of 10YR, value of 5 or 6, and chroma of 3.

The B2 horizon has hue of 10YR or 2.5Y, value of 4, 5, or 6, and chroma of 4. Few to many mottles in shades of gray and brown are present. Texture is silt loam or silty clay loam.

The A'2 horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2, or it has hue of 10YR, value of 7, and chroma of 1 or 2. Texture is silt or silt loam.

The B'x horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 2, 4, or 6. It has few to many mottles of brown and yellow, or the horizon is mottled in shades of brown, gray, and yellow. Texture is silt loam or silty clay loam. Depth to the B'x horizon ranges from 16 to 36 inches.

The B3 horizon, where present, has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2, 3, 4, or 6. Texture is silt loam or silty clay loam.

Collins series

The Collins series consists of moderately well drained, moderately permeable soils that formed in silty alluvium derived from thick loess. These soils are on upland drainageways and foot slopes adjacent to Crowleys Ridge. The native vegetation was mixed hardwoods. Slope is dominantly less than 1 percent.

Collins soils are geographically associated with Falaya soils. Falaya soils, which are on flood plains of upland drainageways, are more poorly drained than Collins soils.

Typical pedon of Collins silt loam, occasionally flooded, in a cultivated field in the SE1/4SW1/4SW1/4 sec. 11, T. 14 N., R. 3 E.:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak medium granular structure; very friable; few fine roots; slightly acid; abrupt smooth boundary.

C1—7 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; massive; very friable; few fine roots; very strongly acid; abrupt smooth boundary.

C2—14 to 21 inches; yellowish brown (10YR 5/4) silt loam; few medium distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; massive; friable; few dark concretions; very strongly acid; clear smooth boundary.

C3—21 to 30 inches; brown (10YR 5/3) silt loam; common medium distinct light yellowish brown (10YR

6/4) and light gray (10YR 7/2) mottles; massive; horizontal bedding planes; friable; few dark concretions; very strongly acid; gradual smooth boundary.

C4g—30 to 41 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct dark yellowish brown (10YR 4/4), light gray (10YR 7/1), and pale brown (10YR 6/3) mottles; massive; horizontal bedding planes; friable; few dark concretions; strongly acid; gradual smooth boundary.

C5g—41 to 50 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct pale brown (10YR 6/3) and yellowish brown (10YR 5/4) mottles; massive; few bedding planes; few dark concretions; strongly acid; gradual smooth boundary.

C6g—50 to 60 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) mottles; massive; few bedding planes; few dark concretions; strongly acid; gradual smooth boundary.

C7g—60 to 72 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; massive; few bedding planes; strongly acid.

Reaction ranges from very strongly acid to strongly acid throughout except for the surface layer where limed.

The A horizon ranges from 6 to 9 inches in thickness. The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

The C1 and C2 horizons have hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The C3 horizon has hue of 10YR, value of 4 or 5, and chroma of 3. The Cg horizon has hue of 10YR, value of 5, 6, or 7, and chroma of 1 or 2. The C horizon has few to common fine and medium brown and gray mottles.

Commerce series

The Commerce series consists of deep, level and nearly level, somewhat poorly drained, moderately slowly permeable soils that formed in stratified beds of loamy sediments. These soils are on broad, lower parts of young natural levees. Slope is dominantly less than 1 percent but ranges to 2 percent along local drainageways. Some areas of these soils are frequently flooded and remain covered from December through April in most years. The water table is at a depth of 1.5 to 4 feet in late winter and early spring.

Commerce soils are geographically associated with Amagon, Bruno, Convent, Falaya, Mhoon, Roellen, and Sharkey soils. Bruno soils, which are on natural levees of flood plains, are excessively drained. Convent soils, which are on broad flats, and Falaya soils, which are on flood plains, have a coarse-silty control section. Amagon and Mhoon soils, which are on flood plains, are poorly drained. Roellen and Sharkey soils, which are in depressions and on broad flood plains, are more clayey than Commerce soils and are poorly drained.

Typical pedon of Commerce very fine sandy loam, in a cultivated area in the SE1/4NE1/4SW1/4 sec. 32, T. 14 N., R. 7 E.:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) very fine sandy loam; weak medium granular structure; very friable; few fine roots; few fine brown concretions; slightly acid; abrupt smooth boundary.

A3—8 to 14 inches; grayish brown (10YR 5/2) silt loam; common medium distinct dark brown (10YR 3/3) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots and pores; few fine brown concretions; neutral; clear wavy boundary.

B21—14 to 23 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct gray (10YR 6/1) and light brownish gray (10YR 6/2) mottles; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; few fine roots and pores; few fine brown concretions; neutral; clear wavy boundary.

B22—23 to 40 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium distinct gray (10YR 6/1) and light brownish gray (10YR 6/2) mottles and common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few fine pores; mildly alkaline; gradual wavy boundary.

C1—40 to 60 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct pale brown (10YR 6/3) and yellowish brown (10YR 5/6) mottles; massive; friable; few fine pores; mildly alkaline; gradual wavy boundary.

C2—60 to 72 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct light brownish gray (10YR 6/2) and yellowish brown (10YR 5/6) mottles; massive; friable; wide veins of gray (10YR 5/1) silt loam and ped coatings; common fine calcium carbonate concretions; mildly alkaline.

Solum thickness ranges from 20 to 40 inches. Reaction ranges from medium acid to neutral in the A horizon, from slightly acid to neutral in the B horizon, and from neutral to mildly alkaline in the C horizon.

The A horizon is less than 10 inches thick in more than 50 percent of any pedon, but ranges up to 12 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 2, but under recent deposition may have chroma of 1. Texture is very fine sandy loam, silt loam, or fine sandy loam.

The B horizon has hue of 10YR, value of 4 or 5, and chroma of 2, or it has hue of 2.5Y, value of 5, and chroma of 2. It is silt loam, silty clay loam, or loam. Few to many fine or medium gray, yellowish brown, and light brownish gray mottles occur.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2, or it has hue of 2.5Y, value of 5, and chroma of 2. It is silt loam, silty clay loam, loam, or very

fine sandy loam. Few to many fine or medium yellowish brown and light brownish gray mottles occur. The C horizon is thinly stratified or bedded in places. Buried A horizons are present within or below the solum of some pedons. There are no to common concretions of calcium carbonate.

Convent series

The Convent series consists of deep, somewhat poorly drained, moderately permeable, level soils on flood plains. These soils formed in silty alluvium. They frequently have a water table within 30 inches of the surface during winter and early spring for periods of as much as 1 month. Slope is dominantly less than 1 percent.

Convent soils are geographically associated with Commerce, Mhoon, and Falaya soils. Commerce soils, which are on broad flats of flood plains, have a fine-silty control section. The level to slightly depressional Mhoon soils, which are on flood plains, have a fine-silty control section and are more poorly drained than Convent soils. Falaya soils, which are on flood plains of local streams, are more acid.

Typical pedon of Convent fine sandy loam, in a cultivated area in the NE1/4NE1/4NE1/4 sec. 23, T. 16 N., R. 7 E. (The pedon is in the NE corner of a section of less than 640 acres because of a correction of a geodetic line.):

Ap1—0 to 6 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very friable; common fine roots; slightly acid; abrupt smooth boundary.

Ap2—6 to 11 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; very friable; common fine roots; few fine dark concretions; slightly acid; abrupt smooth boundary.

C1—11 to 20 inches; grayish brown (10YR 5/2) silt loam; few medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium platy structure; friable; few fine roots; few fine dark concretions; neutral; clear wavy boundary.

C2—20 to 32 inches; grayish brown (2.5Y 5/2) silt loam; common medium distinct dark yellowish brown (10YR 3/4) and few medium prominent dark brown (7.5YR 4/4) mottles; weak medium platy structure; friable; few fine roots; few fine dark concretions; neutral; clear wavy boundary.

C3—32 to 41 inches; grayish brown (2.5Y 5/2) silt loam; common medium distinct light brownish gray (2.5Y 6/2) and common medium prominent dark brown (7.5YR 4/4) mottles; weak medium platy structure; friable; few fine roots; neutral; clear wavy boundary.

Ab—41 to 49 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct pale brown (10YR 6/3) and yellowish brown (10YR 5/6) and common medium prominent dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; friable; slightly acid; clear smooth boundary.

IIC1—49 to 57 inches; pale brown (10YR 6/3) very fine sandy loam; common medium distinct yellowish brown (10YR 5/6) and many medium prominent dark brown (7.5YR 4/4) mottles; weak medium platy structure; very friable; slightly acid; clear smooth boundary.

IIC2—57 to 70 inches; pale brown (10YR 6/3) silt loam; many medium yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) mottles; weak medium platy structure; friable; few fine dark concretions; slightly acid; clear smooth boundary.

IIC—70 to 76 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium platy structure; firm; neutral.

Reaction ranges from medium acid to neutral in the A and C horizons and from slightly acid to neutral in the Ab and IIC horizons, where present.

The A horizon is about 10 inches thick but ranges to as much as 14 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2; hue of 7.5YR, value of 4, and chroma of 2; or hue of 10YR, value of 6, and chroma of 3. Texture is silt loam, fine sandy loam, or loam. Content of clay averages between 10 and 18 percent, and content of fine sand and coarser, between 5 and 15 percent. Some pedons have an Ab or IIC horizon at a depth of 40 inches or more; these horizons are finer textured. Common to many yellowish brown, gray, and brown mottles are throughout the horizon.

Small areas of soils in which content of fine sand and coarser is 15 to 20 percent were considered Convent in naming map units. Their behavior is enough like Convent soils that nothing would be gained by adding another series name.

Dubbs series

The Dubbs series consists of well drained, moderately permeable soils that formed in loamy alluvium. These soils are on natural levees bordering abandoned stream channels. The native vegetation was mixed hardwoods. Slope is 0 to 3 percent.

Dubbs soils are geographically associated with Amagon, Beulah, and Dundee soils. Amagon soils, which are on broad flats on the lower parts of natural levees and in shallow depressions, are grayer and more poorly drained than Dubbs soils. Beulah soils, which are on higher parts of natural levees bordering bayous, have a coarse-loamy control section. Dundee soils, which are on lower parts of natural levees bordering abandoned stream channels, are somewhat poorly drained.

Typical pedon of Dubbs fine sandy loam, 0 to 1 percent slopes, in a cultivated area in the SE1/4SE1/4SW1/4 sec. 23, T. 16 N., R. 7 E.:

Ap1—0 to 9 inches; brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; medium acid; clear wavy boundary.

Ap2—9 to 12 inches; brown (10YR 4/3) fine sandy loam; weak medium granular structure; very friable; strongly acid; abrupt smooth boundary.

B21t—12 to 20 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; very friable; few patchy clay films on faces of peds; strongly acid; clear wavy boundary.

B22t—20 to 27 inches; dark brown (7.5YR 4/4) silt loam; weak medium subangular blocky structure; very friable; few patchy clay films on faces of peds; strongly acid; clear wavy boundary.

B23t—27 to 41 inches; dark brown (7.5YR 4/4) silty clay loam; few fine distinct light brownish gray mottles; moderate medium subangular blocky structure; very friable; common patchy clay films on faces of peds; strongly acid; clear wavy boundary.

B3—41 to 45 inches; dark brown (7.5YR 4/4) loam; weak medium subangular blocky structure; very friable; strongly acid; clear wavy boundary.

C1—45 to 57 inches; yellowish brown (10YR 5/4) loamy sand; massive; very friable; 3-inch band of sandy loam in lower part; very strongly acid; clear wavy boundary.

C2—57 to 72 inches; yellowish brown (10YR 5/4) loamy sand; massive; loose; medium acid.

Solum thickness ranges from 20 to 55 inches. Reaction ranges from medium acid to very strongly acid throughout.

The A horizon ranges from 4 to 12 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 3. Texture is fine sandy loam or silt loam.

The B horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4, or it has hue of 7.5YR, value of 4 or 5, and chroma of 4. Texture is loam, silt loam, or silty clay loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 4. Texture ranges from fine sandy loam to loamy sand.

Dundee series

The Dundee series consists of somewhat poorly drained, moderately slowly permeable soils that formed in beds of loamy alluvium. These soils are on the lower parts of natural levees bordering abandoned stream channels. A water table is within 2 feet of the surface during winter and early in spring. The native vegetation was mixed hardwoods. Slope is dominantly less than 1 percent.

Dundee soils are geographically associated with Amagon, Beulah, Bruno, and Dubbs soils. Amagon soils, which are on broad flats on the lower parts of old natural levees, are more poorly drained than Dundee soils. Beulah and Bruno soils, which are on the higher parts of natural levees, are more sandy and are better drained. Dubbs soils, which are on older natural levees bordering abandoned stream channels, are better drained.

Typical pedon of Dundee fine sandy loam, in a cultivated area of Dundee-Bruno-Commerce complex in the NE1/4SW1/4NE1/4 sec. 2, T. 13 N., R. 7 E.:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak medium granular structure; friable; common fine roots; medium acid; abrupt smooth boundary.

B21tg—7 to 11 inches; dark grayish brown (10YR 4/2) silt loam; few medium distinct dark yellowish brown (10YR 3/4) mottles; weak medium subangular blocky structure; friable; few patchy clay films on faces of peds; common fine roots; medium acid; abrupt smooth boundary.

B22tg—11 to 19 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few patchy clay films on faces of peds; few fine roots; few dark concretions; strongly acid; clear wavy boundary.

B23tg—19 to 26 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few patchy clay films; few dark concretions; strongly acid; clear wavy boundary.

B24tg—26 to 45 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm; few dark concretions; few patchy clay films; strongly acid; gradual wavy boundary.

B3g—45 to 58 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few dark concretions; strongly acid; clear wavy boundary.

Cg—58 to 72 inches; gray (10YR 6/1) loam; common medium distinct dark yellowish brown (10YR 3/4, 10YR 4/4) mottles; massive; friable; few dark concretions; strongly acid.

Solum thickness ranges from 24 to 60 inches. Reaction ranges from very strongly acid to medium acid in the A and B horizons except for the surface layer where limed. The C horizon is very strongly acid to neutral.

The Ap horizon ranges from 4 to 8 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Texture is silt loam or fine sandy loam.

The B2t horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. The B3 horizon has hue of 10YR, value of 6, and chroma of 1 or 2. The B horizon is silt loam, loam, or silty clay loam.

The C horizon has hue of 10YR with value of 5 or 6 and chroma of 1, or with value of 6 and chroma of 2. Texture is silt loam, loam, or fine sandy loam.

Falaya series

The Falaya series consists of somewhat poorly drained, moderately permeable soils that formed in silty alluvium derived from loess deposits. These soils are on upland drainageways and foot slopes adjacent to Crowleys Ridge. The native vegetation was mixed hardwoods. Slope is dominantly less than 1 percent.

Falaya soils are geographically associated with Collins, Commerce, Convent, and Tichnor soils. Collins soils, which are in upland drainageways, are better drained than Falaya soils. Commerce and Convent soils, which are on broad flood plains, are less acid. In addition, Commerce soils have a fine-silty control section. Tichnor soils, which are in upland drainageways, formed from material washed from loess, have an A horizon more than 24 inches thick, have a fine-silty control section, and are more poorly drained.

Typical pedon of Falaya silt loam, occasionally flooded, in a cultivated area in the SW1/4SE1/4SW1/4 sec. 16, T. 14 N., R. 4 E.:

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

C1—6 to 14 inches; brown (10YR 4/3) silt loam; few fine faint yellowish brown mottles; weak medium granular structure; friable; common fine roots; strongly acid; clear smooth boundary.

C2g—14 to 23 inches; grayish brown (10YR 5/2) silt loam; common fine and medium distinct yellowish brown (10YR 5/6, 10YR 5/4) and brown (10YR 5/3) mottles; few fine and medium black and brown specks and stains; weak medium platy structure parting to weak fine and medium subangular blocky, massive in places; friable; common fine roots; very strongly acid; clear wavy boundary.

C3g—23 to 38 inches; grayish brown (10YR 5/2) silt; common fine and medium distinct yellowish brown (10YR 5/6), dark yellowish brown (10YR 4/4), and light gray (10YR 7/1) mottles; weak fine and medium subangular blocky structure, massive in places; friable; few fine roots; few dark concretions; very strongly acid; clear smooth boundary.

C4g—38 to 48 inches; light brownish gray (10YR 6/2) silt; common fine and medium distinct yellowish brown (10YR 5/4), dark yellowish brown (10YR 3/4), and light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable; few dark concretions; very strongly acid; clear smooth boundary.

A2gb—48 to 60 inches; gray (10YR 6/1) silt loam; many fine to coarse distinct light gray (10YR 7/1), yellowish brown (10YR 5/4), and dark brown (10YR 4/3) mottles; weak medium platy sructure parting to weak medium subangular blocky; friable; slightly brittle; common black and brown concretions; common pores; black stains and veins; very strongly acid; clear wavy boundary.

Axb—60 to 72 inches; light brownish gray (10YR 6/2) silt loam; common medium and large distinct yellowish brown (10YR 5/4, 10YR 5/6) and dark brown (10YR 4/3) mottles; weak medium platy structure parting to weak medium subangular blocky; firm; slightly brittle; compact in places; few vesicular pores; clay films between plates and in pores; common brown and black concretions; very strongly acid.

Reaction ranges from strongly acid to very strongly acid throughout except for the surface layer where limed. Depth to buried horizons ranges from 30 to 60 inches.

The A horizon ranges from 5 to 10 inches in thickness. The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The C1, C2g, and C3g horizons have hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The C4g, A2gb, and Axb horizons have hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Mottles range from dark brown and dark yellowish brown to gray and are present throughout these horizons. The gray mottles have higher chroma.

Foley series

The Foley series consists of poorly drained, very slowly permeable soils that formed in loamy sediments of loess-like material. These soils are on broad flats. They have a seasonal high water table during late winter and early spring. The native vegetation was mixed hardwood forests. Slope is dominantly less than 1 percent.

Foley soils are geographically associated with Amagon, Calhoun, Fountain, Hillemann, Henry, Jackport, and Lafe soils. Amagon soils, which are on broad flats on the lower parts of old natural levees and in shallow depressions, lack a natric horizon. Calhoun, Fountain, and Jackport soils, which are on broad flats, also lack a natric horizon; in addition, Calhoun and Fountain soils have tongues of the A2 horizon extending into the B horizon. Hillemann and Lafe soils are on broad flats. The upper part of the B horizon in Hillemann and Lafe soils has higher content of sodium and magnesium. Hillemann soils are medium acid or slightly acid in the lower part of the B horizon. Henry soils, which are in depressions on uplands, have a fragipan.

Typical pedon of Foley silt loam, in a cultivated area in the NE1/4SE1/4SE1/4 sec. 14, T. 13 N., R. 4 E.:

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; weak medium granular structure; friable; few fine roots; common pores; medium acid; abrupt smooth boundary.

A2—5 to 12 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/8) and dark yellowish brown (10YR 4/4) mottles; weak fine to medium granular structure; friable; few fine roots; few pores; few fine brown concretions; medium acid; abrupt wavy boundary.

B1g—12 to 20 inches; grayish brown (10YR 5/2) silt loam; few medium distinct brown (10YR 4/3) and gray (10YR 6/1) mottles; moderate medium subangular blocky structure; firm; few fine roots; silt tongues 1/2 to 1 inch wide; few fine brown concretions; medium acid; clear wavy boundary.

B21tg—20 to 27 inches; grayish brown (10YR 5/2) silty clay loam; few fine distinct yellowish brown and gray mottles; moderate medium subangular blocky structure; firm; few patchy clay films on faces of peds; gray silt tongues as much as 1 inch wide extend throughout the horizon; few fine brown concretions; medium acid; abrupt wavy boundary.

B22tg—27 to 48 inches; gray (5Y 6/1) silty clay loam; common fine distinct brown and gray mottles; moderate medium subangular blocky structure; firm, sticky, plastic; common clay films on faces of peds; gray silt in seams between peds; few fine dark concretions; mildly alkaline; clear wavy boundary.

B3—48 to 61 inches; grayish brown (2.5Y 5/2) silty clay loam; few medium distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; gray silt in seams between peds; few fine dark concretions; moderately alkaline; clear wavy boundary.

C—61 to 72 inches; grayish brown (2.5Y 5/2) silt loam; common medium distinct strong brown (7.5YR 5/8) mottles; structureless to weak medium subangular blocky structure; few calcium carbonate concretions; moderately alkaline.

Solum thickness ranges from about 40 to more than 72 inches. Reaction ranges from very strongly acid to medium acid in the A horizon and from medium acid to moderately alkaline in the B and C horizons. Depth to the natric horizon ranges from about 18 to 30 inches.

The A horizon ranges from about 6 to 15 inches in thickness. The Ap horizon has hue of 10YR with value of 4 or 5 and chroma of 2, or with value of 5 and chroma of 3. The A2 horizon has hue of 10YR with value of 5 or 6 and chroma of 2, or with value of 6 and chroma of 1.

The B horizon has hue of 10YR, 2.5Y, or 5Y, value of 4, 5, or 6, and chroma of 1 or 2. Texture is silt loam or silty clay loam. Brown and grayish mottles are present throughout.

Fountain series

The Fountain series consists of poorly drained, moderately slowly permeable soils that formed in loamy sediments. These soils are on broad flats. They are saturated with water in late winter and early spring. The native vegetation was mixed hardwoods. Slope is dominantly less than 1 percent.

Fountain soils are geographically associated with Amagon, Calhoun, Foley, Jackport, and Lafe soils. Amagon soils, which are on broad flats on the lower parts of old natural levees, lack tonguing of the A2 horizon into the B horizon. Calhoun soils, which are on broad flats of terraces, are more acid than Fountain soils. Foley soils, which are on broad flats, have a natric horizon. Jackport soils, which are in slack water areas, formed in clayey sediments. Lafe soils, which are on narrow flats of loessial and fluvial terraces, are browner and have a natric horizon.

Typical pedon of Fountain silt loam, in a wooded area in the NE1/4SW1/4SW1/4 sec. 12, T. 15 N., R. 5 E.:

O1—2 inches to 0; partially decomposed leaves, twigs, and roots; friable; medium acid; abrupt smooth boundary.

A1—0 to 5 inches; dark brown (10YR 4/3) silt loam; black (10YR 2/1) organic pockets; weak medium granular structure; friable; many medium roots; medium acid; clear wavy boundary.

A2—5 to 15 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; many medium roots; medium acid; clear wavy boundary.

B&A—15 to 22 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6, 10YR 5/8) mottles; weak medium subangular blocky structure; friable; gray (10YR 5/1) vertical silt tongues 1 inch to 2 inches wide; common fine roots; few dark fine concretions; medium acid; clear irregular boundary.

B21tg—22 to 30 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few patchy clay films on faces of peds; gray (10YR 5/1) silt tongues 2 to 3 inches wide; few tree roots; neutral; clear wavy boundary.

B22tg—30 to 46 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common patchy clay films on faces of peds; few tree roots; common dark concretions; silt tongues 2 to 3 inches wide; mildly alkaline; clear wavy boundary.

B23tg—46 to 60 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; common patchy clay films on faces of peds; few tree roots; common calcium carbonate concretions; mildly alkaline; clear wavy boundary.

Cg—60 to 72 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6, 10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few calcium carbonate concretions; mildly alkaline.

Solum thickness ranges from 40 to 60 inches. Reaction ranges from medium acid to neutral in the A and B&A

horizons and from neutral to mildly alkaline in the Bt and C horizons.

The A horizon ranges from 6 to 15 inches in thickness. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2. The A2 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2.

The B horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2. Texture is silt loam or silty clay loam. Few to common fine and medium brown, gray, or yellow mottles are throughout the horizon.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. Texture is silt loam or silty clay loam.

Grenada series

The Grenada series consists of moderately well drained, nearly level soils that formed in deposits of loess on uplands. Permeability is moderate above the fragipan and slow in the fragipan. Slope is 1 to 3 percent. The fragipan restricts the penetration of roots and the movement of water. The native vegetation is mixed hardwoods.

Grenada soils are geographically associated with Calloway, Henry, and Loring soils. Calloway soils, which are on terraces, are more poorly drained than Grenada soils and have mottles with chroma of 2 or less in the upper 10 inches of the B horizon. Henry soils, which are on broad upland flats and in depressions, are grayer and more poorly drained. Loring soils, which are on uplands, have single clay maxima above the fragipan.

Typical pedon of Grenada silt loam, 1 to 3 percent slopes, in a cultivated area in the NE1/4SE1/4NW1/4 sec. 7, T. 13 N., R. 5 E.:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; few fine roots; strongly acid; abrupt smooth boundary.

B21—5 to 14 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few dark concretions; strongly acid; clear wavy boundary.

B22—14 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; few medium distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; few dark concretions; very strongly acid; clear wavy boundary.

A'2—18 to 23 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; brittle; few fine roots; few dark concretions; very strongly acid; abrupt irregular boundary.

B'x1—23 to 38 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; brittle; few patchy clay films on faces of peds; few fine roots; few dark concretions; very strongly acid; clear wavy boundary.

B'x2—38 to 48 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light gray (10YR 7/2) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; brittle; few patchy clay films on faces of peds; few fine roots; few dark concretions; very strongly acid; clear wavy boundary.

B'x3—48 to 62 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; brittle; few patchy clay films on faces of peds; few dark concretions; few dark veins; strongly acid; clear wavy boundary.

C—62 to 72 inches; dark brown (7.5YR 4/4) loam; few fine distinct light brownish gray (10YR 6/2) mottles; massive; friable; few dark concretions; strongly acid.

Solum thickness exceeds 60 inches. Reaction is strongly acid or medium acid in the A horizon, ranges from very strongly acid to medium acid in the B horizon, and ranges from strongly acid to neutral in the C horizon. Depth to the fragipan ranges from 20 to 30 inches.

The A horizon is dominantly less than 6 inches thick but ranges to as much as 8 inches in thickness. The A horizon has hue of 10YR with value of 4 and chroma of 2 or 3, or with value of 5 and chroma of 2 or 4.

The B2 horizon has hue of 10YR, value of 4 or 5, and chroma of 4. Texture is silt loam or silty clay loam. The A'2 horizon has hue of 2.5Y, value of 5 or 6, and chroma of 2, or it has hue of 10YR, value of 5, 6, or 7, and chroma of 1 or 2. Mottles are in shades of brown. The Bx horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4. Mottles are in shades of brown, yellow, or gray. Texture is silt loam or silty clay loam.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 or 4. Texture is silt loam, loam, or silty clay loam.

Henry series

The Henry series consists of poorly drained, slowly permeable soils on broad upland flats and in depressions. These soils formed in deposits of thick loess. Slope is 1 percent or less. The fragipan restricts the penetration of roots and the movement of water. The native vegetation is mixed hardwoods.

Henry soils are geographically associated with Calhoun, Calloway, Foley, Grenada, and Hillemann soils. Calhoun and Foley soils, which are on broad flats and in depressions on terraces, lack a fragipan; in addition, Foley soils have a natric horizon. Calloway and Grenada soils, which are on uplands, are browner and better drained than Henry soils. Hillemann soils, which are on broad flats, have a natric horizon and are better drained.

Typical pedon of Henry silt loam, in a cultivated area in the NE1/4NW1/4NW1/4 sec. 33, T. 13 N., R. 3 E.:

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam; common medium and fine strong brown (7.5YR 5/6) mottles that follow roots and root channels; weak fine granular structure; friable; many fine roots; common pores; medium acid; abrupt smooth boundary.

A21g—6 to 14 inches; gray (10YR 6/1) silt loam; common medium and fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; common pores; few fine black concretions; strongly acid; clear smooth boundary.

A22g—14 to 24 inches; gray (10YR 5/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; common fine roots; common pores; few fine concretions; very strongly acid; clear smooth boundary.

A23g—24 to 32 inches; gray (10YR 6/1) silt loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few pores; few fine black concretions; very strongly acid; clear smooth boundary.

Bx—32 to 49 inches; grayish brown (10YR 5/2) silty clay loam; few medium distinct light olive brown (2.5Y 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; brittle; common clay films on faces of peds; gray silt in seams between prisms and on faces of peds; common pores; common fine black concretions; very strongly acid; clear smooth boundary.

B21g—49 to 59 inches; gray (10YR 5/1) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine pores; gray silt in some seams; strongly acid; clear smooth boundary.

B32g—59 to 72 inches; gray (10YR 5/1) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine pores; few fine black concretions; medium acid; gradual smooth boundary.

Cg—72 to 84 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; neutral.

Solum thickness ranges from 48 to 72 inches or more. Reaction ranges from very strongly acid to medium acid in the A horizon, from very strongly acid to medium acid in the B horizon, and from medium acid to mildly alkaline in the C horizon.

The A horizon ranges from 24 to 36 inches in thickness. The Ap horizon has hue of 10YR with value of 4 or 5 and chroma of 2 or 3, or with value of 6 and chroma of 2. The A2g horizon has hue of 10YR, value of 4, 5, or 6, and chroma of 1 or 2.

The B horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. Texture is silt loam or silty clay loam. Few to common fine and medium yellow, brown, or gray mottles are throughout the horizon.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 1, 2, or 3. Texture is silt or silt loam.

Hillemann series

The Hillemann series consists of somewhat poorly drained, very slowly permeable soils that formed primarily in silty sediments. These soils are on broad flats. They have a seasonal high water table during late winter and early spring. The native vegetation was mixed hardwood forests. Slope is dominantly less than 1 percent.

Hillemann soils are geographically associated with Calhoun, Foley, Henry, Jackport, and Tichnor soils. Calhoun soils, which are on broad flats, are more poorly drained and have tonguing of the A2 horizon into the B horizon. Foley soils, which are on broad flats, are neutral to strongly alkaline in lower part of the B horizon. Henry soils, which are on broad upland flats, have a fragipan. Jackport soils, which are on broad flats in abandoned backswamps, lack a natric horizon. Tichnor soils, which are in upland drainageways, formed from material washed from loess, have an A horizon more than 24 inches thick, and are more poorly drained.

Typical pedon of Hillemann silt loam, in a cultivated area in the NW1/4SW1/4NW1/4 sec. 17, T. 13 N., R. 2 E.:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; few medium distinct dark yellowish brown (10YR 4/4) and grayish brown (10YR 5/2) mottles; weak medium granular structure; friable; many roots; red stains along root channels; strongly acid; abrupt smooth boundary.

A2—8 to 16 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium granular structure; friable; common rice roots; many fine pores; red stains along roots and root channels; few fine dark concretions; strongly acid; clear smooth boundary.

B21tg—16 to 29 inches; grayish brown (10YR 5/2) silty clay loam; many medium prominent red (2.5YR 4/6) and dark red (2.5YR 3/6) mottles; moderate medium subangular blocky structure; firm, plastic; few fine roots; patchy clay films on faces of peds; few tongues of gray silt; few fine dark concretions; strongly acid; gradual wavy boundary.

B22tg—29 to 40 inches; light brownish gray (10YR 6/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm, plastic; few fine roots; patchy clay films on faces of peds; few tongues of gray silt loam; common fine dark concretions; strongly acid; clear wavy boundary.

B3g—40 to 53 inches; light brownish gray (10YR 6/2) silt loam; common fine and medium distinct yellowish

brown (10YR 5/6) and grayish brown (10YR 5/2) and few medium prominent dark reddish brown (5YR 3/4) mottles; weak medium subangular blocky structure; friable; few fine roots; few black veins; common fine dark concretions; slightly acid; clear wavy boundary.

Cg—53 to 72 inches; light brownish gray (10YR 6/2) silt loam; many medium and large distinct dark yellowish brown (10YR 4/4) and few medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; common fine dark concretions; neutral.

Solum thickness exceeds 48 inches. Reaction ranges from strongly acid to medium acid in the A and B2tg horizons and from medium acid to slightly acid in the B3g horizon. Reaction of the C horizon is slightly acid to neutral.

The A horizon ranges from 12 to 18 inches in thickness. The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3. The A2 horizon has hue of 10YR with value of 5 and chroma of 1 or 2, or with value of 5 and chroma of 2.

The B2 horizon has hue of 10YR, value of 5 or 6, and chroma of 2. The B3 horizon has hue of 10YR, value of 5 or 6, and chroma of 1 through 3. Common fine and medium prominent yellowish red or red mottles are present in the B2 horizon, and brown and red mottles are present in the B3 horizon. Texture of the B2 horizon is silty clay or silty clay loam.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 2. Texture of the B3 and C horizons is silt loam or silty clay loam. Sodium saturation is 15 percent or more at a depth of about 22 to 36 inches.

Jackport series

The Jackport series consists of poorly drained, very slowly permeable soils that formed in beds of predominantly clayey sediments. These soils are on broad flats in slack water areas on stream terraces. They have a seasonal high water table in late winter and early spring. The native vegetation was hardwood forests. Slope is dominantly less than 1 percent.

Jackport soils are geographically associated with Amagon, Foley, Fountain, Hillemann, and Lafe soils. Amagon soils, which are on natural levees, are coarser textured than Jackport soils and formed in loamy sediments. Foley, Hillemann, and Lafe soils, which are on broad flats, have a natric horizon. Fountain soils, which are on broad flats, have a coarser textured control section.

Typical pedon of Jackport silty clay loam, in a cultivated area in the SE1/4NE1/4NE1/4 sec. 35, T. 15 N., R. 2 E.:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam; weak medium granular structure grading to weak medium subangular blocky; friable; few fine roots; strongly acid; abrupt smooth boundary.

A2—6 to 12 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct brown (10YR 4/3) and dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear wavy boundary.

B21tg—12 to 23 inches; grayish brown (2.5Y 5/2) silty clay; common medium distinct gray (10YR 6/1) and dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; few dark concretions; few slickensides; peds have shiny faces; very strongly acid; gradual wavy boundary.

B22tg—23 to 37 inches; grayish brown (2.5Y 5/2) clay; common medium prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; very firm, very plastic; few fine roots; common dark concretions; few slickensides; peds have shiny faces; very strongly acid; gradual wavy boundary.

B23tg—37 to 49 inches; dark grayish brown (2.5Y 4/2) clay; moderate medium subangular blocky structure; few fine distinct light olive brown mottles; very firm, very plastic; few fine roots; few slickensides; few dark concretions; neutral; gradual wavy boundary.

C1g—49 to 61 inches; dark grayish brown (2.5Y 4/2) silty clay; massive; few fine distinct light olive brown mottles; very firm, very plastic; few slickensides; many dark concretions; common calcium carbonate concretions; mildly alkaline; gradual wavy boundary.

C2g—61 to 72 inches; light brownish gray (2.5Y 6/2) silty clay loam; massive; firm; common dark concretions; mildly alkaline.

Solum thickness ranges from about 30 to 60 inches. Reaction ranges from very strongly acid to medium acid in the A horizon, from very strongly acid to mildly alkaline in the B horizon, and from slightly acid to mildly alkaline in the C horizon.

The A horizon ranges from 4 to 14 inches in thickness. The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2. Some pedons lack an A2 horizon.

The B2tg horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 2, or it has hue of 2.5Y, value of 4, and chroma of 2. Texture is clay, silty clay, or silty clay loam.

The Cg horizon has hue of 10YR with value of 5 and chroma of 1 or 2, or with value of 6 and chroma of 1, or it has hue of 2.5Y, value of 4, 5, or 6, and chroma of 2. Texture is silty clay, silty clay loam, or silt loam.

Lafe series

The Lafe series consists of somewhat poorly drained, very slowly permeable, level soils on narrow flats of loessial and fluvial terraces. Slope is dominantly less than 1 percent.

Lafe soils are geographically associated with Calhoun, Foley, Fountain, and Jackport soils. Calhoun and Fountain soils, which are on broad flats, lack a natric horizon and are more poorly drained than Lafe soils. Foley soils, which are also on broad flats, have a natric horizon at a greater

depth and are more poorly drained. Jackport soils, which are on broad flats in slack water areas, are more clayey and more poorly drained. They also lack a natric horizon.

Typical pedon of Lafe silt loam, in a cultivated area in the SE1/4NW1/4SE1/4 sec. 31, T. 15 N., R. 6 E.:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

A1—5 to 10 inches; brown (10YR 5/3) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium granular structure parting to weak fine and medium subangular blocky; friable; few fine roots; neutral; abrupt wavy boundary.

B21t—10 to 19 inches; pale brown (10YR 6/3) silty clay loam; common medium distinct yellowish brown (10YR 5/8) and gray (10YR 6/1) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; gray (10YR 6/1) silt tongues and interfingers between prisms; clay films and silt coatings on faces of peds; mildly alkaline; clear wavy boundary.

B22t—19 to 35 inches; pale brown (10YR 6/3) silty clay loam; common medium distinct yellowish brown (10YR 5/8) and common medium distinct gray (10YR 6/1) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; gray (10YR 6/1) silt tongues and interfingers between prisms; clay films and silt coatings on faces of peds; patchy weblike black coatings on peds; few dark concretions; moderately alkaline; clear wavy boundary.

B23t—35 to 50 inches; light brownish gray (10YR 6/2) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; gray (10YR 6/1) silt tongues and interfingers between prisms; clay films and silt coatings on faces of peds; common black veins; few dark concretions; moderately alkaline; clear wavy boundary.

C1—50 to 64 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/8) and dark yellowish brown (10YR 3/4) mottles; massive; friable; few dark concretions; strongly alkaline; clear wavy boundary.

C2—64 to 72 inches; light gray (10YR 7/2) silt loam; common medium distinct yellowish brown (10YR 5/8) and dark yellowish brown (10YR 3/4) mottles; massive; friable; few dark concretions; strongly alkaline.

Solum thickness ranges from about 20 to 50 inches. Reaction ranges from strongly acid through neutral in the A horizon, ranges from mildly alkaline through strongly alkaline in the B horizon, and is moderately alkaline or strongly alkaline in the C horizon. Depth to horizons in which sodium and magnesium saturation is more than 15 percent is 3 to 12 inches.

The A horizon ranges from 6 to 12 inches in thickness. The Ap and A1 horizons have hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B2t horizon has hue of 10YR, value of 5, and chroma of 3 or 4, or it has hue of 10YR, value of 6, and chroma of 2 or 3. Mottles are in shades of grays and brown. Texture is silt loam or silty clay loam.

The C horizon has hue of 10YR, value of 6 or 7, and chroma of 1, 2, or 3. Texture is silt loam or silty clay loam.

Loring series

The Loring series consists of moderately well drained soils that formed in deposits of thick loess. These nearly level to moderately sloping soils are on uplands. Permeability is moderate above the fragipan and moderately slow in the fragipan. Slope is 1 to 12 percent. The native vegetation is mixed hardwoods.

Loring soils are geographically associated with Brandon, Calloway, Grenada, Memphis, and Saffell soils. The moderately sloping and moderately steep Brandon soils, which are on uplands, lack a fragipan and have base saturation of less than 35 percent at a depth of 50 inches below the upper boundary of the argillic horizon. The level and nearly level Calloway and Grenada soils, which are on uplands, are bisequal. In addition, Calloway soils have mottles with chroma of 2 or less within 16 inches of the surface. The moderately steep Memphis soils, which are on uplands, lack a fragipan. Saffell soils, which formed in predominantly gravelly water-laid material, lack a fragipan.

Typical pedon of Loring silt loam, 3 to 8 percent slopes, in a wooded area in the NE1/4NW1/4NW1/4 sec. 28, T. 13 N., R. 4 E.:

A1—0 to 2 inches; brown (10YR 4/3) silt loam; weak medium granular structure; friable; common roots; very strongly acid; abrupt smooth boundary.

B1—2 to 8 inches; brown (7.5YR 4/4) silty clay loam; weak medium subangular blocky structure; friable; common medium roots; strongly acid; clear wavy boundary.

B2t—8 to 28 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; firm; ped faces of brown (7.5YR 4/4); few medium roots; patchy clay films on faces of peds; strongly acid; gradual wavy boundary.

Bx1—28 to 36 inches; brown (7.5YR 4/4) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; prisms are dense and brittle; few medium roots; friable; gray silt in seams; few patchy clay films on faces of peds; strongly acid; clear wavy boundary.

Bx2—36 to 54 inches; brown (7.5YR 4/4) silty clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; prisms are dense and brittle; common veins of light brownish gray (10YR 6/2) and light gray (10YR 7/2) silt loam;

patchy clay films on faces of peds; strongly acid; clear wavy boundary.

Bx3—54 to 72 inches; brown (7.5YR 4/4) silty clay loam; weak coarse prismatic structure parting to weak medium subangular blocky; firm; prisms are dense and brittle; few veins of light gray (10YR 7/2) silt loam; few sand grains; patchy clay films on faces of peds; strongly acid.

Solum thickness ranges from 45 to 75 inches. Reaction ranges from strongly acid to medium acid in the A and B horizons.

The A horizon is dominantly less than 6 inches thick but ranges up to 9 inches in thickness. The A horizon has hue of 10YR with value of 4 and chroma of 3, or with value of 5 and chroma of 4.

The B1 and B2t horizons have hue of 10YR or 7.5YR, value of 4, and chroma of 4, or it has hue of 10YR, value of 5, and chroma of 4 or 6. The Bx horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 4, or it has hue of 7.5YR, value of 5, and chroma of 4. Mottles are in shades of yellow, brown, or gray. Depth to the fragipan ranges from 22 to 32 inches.

Memphis series

The Memphis series consists of well drained, moderately permeable soils that formed in thick deposits of loess. These moderately steep and steep soils are on uplands of Crowleys Ridge. Slope is 12 to 40 percent. The native vegetation was mixed hardwoods.

Memphis soils are geographically associated with Loring, Brandon, and Saffell soils. The nearly level to moderately sloping Loring soils, which are on uplands, have a fragipan and a mottled subsoil. The moderately sloping and moderately steep Brandon soils, which are on uplands, have a fine-silty control section over gravelly loamy material. The moderately steep Saffell soils, which are on uplands, have a loamy-skeletal control section.

Typical pedon of Memphis silt loam, 12 to 40 percent slopes, in a wooded area in the SE1/4SE1/4SE1/4 sec. 29, T. 15 N., R. 3 E.:

A1—0 to 4 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; strongly acid; abrupt smooth boundary.

A2—4 to 10 inches; brown (10YR 5/3) silt loam; weak medium and fine granular structure; friable; common fine roots; few streaks and crack fills of light yellowish brown (10YR 6/4) silt; very strongly acid; clear smooth boundary.

B21t—10 to 17 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; firm; common fine roots; pale brown silt around roots; continuous clay films on faces of peds; very strongly acid; clear wavy boundary.

B22t—17 to 27 inches; dark brown (7.5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; few fine roots; few light yellowish brown silt coatings along faces of peds; few patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B23t—27 to 42 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium and fine subangular blocky structure; firm; few fine roots; common dark patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

B24t—42 to 56 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium and fine subangular blocky structure; firm; few fine roots; common dark patchy clay films on faces of peds; few pale brown silt coatings on faces of peds and in cracks; few dark concretions; very strongly acid; clear wavy boundary.

C—56 to 72 inches; dark brown (7.5YR 4/4) silty clay loam; massive; firm; few pale brown silt coatings on faces of peds; dark veins and stains between peds; few dark concretions; very strongly acid.

Solum thickness ranges from 32 to 72 inches. Reaction of the A horizon ranges from very strongly acid to medium acid. The B and C horizons are very strongly acid or strongly acid.

The A horizon is dominantly less than 12 inches thick but ranges to as much as 14 inches in thickness. It has hue of 10YR with value of 4 or 5 and chroma of 3, or with value of 4 and chroma of 4.

The B horizon has hue of 7.5YR and 10YR with value of 4 or 5 and chroma of 4, or with value of 5 and chroma of 6. Texture is silt loam or silty clay loam. Some pedons lack gray or pale brown silt coatings in cracks and between peds. Clay films on faces of peds range from patchy to continuous.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4. Texture is silt loam or silty clay loam.

Mhoon series

The Mhoon series consists of poorly drained, slowly permeable, level to depressional soils on flood plains. These soils formed in mixed alluvial sediments. They are frequently saturated in late winter and early spring. Slope is dominantly less than 1 percent but ranges to 2 percent along local drainageways. These soils are frequently flooded where they occur in the St. Francis Floodway.

Mhoon soils are geographically closely associated with Commerce, Convent, Roellen, and Sharkey soils. Commerce and Convent soils, which are on flood plains, are better drained than Mhoon soils and have higher chroma. Roellen and Sharkey soils, which are on broad flats and in slack water areas, are more clayey.

Typical pedon of Mhoon fine sandy loam, in a cultivated area in the SW1/4SW1/4NE1/4 sec. 12, T. 15 N., R. 7 E.:

Ap1—0 to 5 inches; very dark grayish brown (10YR 3/2) fine sandy loam; weak medium granular structure; fri-

able; common fine roots; neutral; abrupt smooth boundary.

Ap2—5 to 8 inches; dark gray (10YR 4/1) fine sandy loam; few fine distinct dark yellowish brown mottles; weak medium granular structure; friable; common fine roots; few small pockets of organic debris; neutral; abrupt smooth boundary.

B1g—8 to 19 inches; dark gray (10YR 4/1) silty clay loam; few medium distinct dark yellowish brown mottles; moderate medium subangular blocky structure; friable; common fine roots; neutral; clear wavy boundary.

B2g—19 to 26 inches; gray (10YR 5/1) silty clay loam; few medium distinct dark yellowish brown mottles; moderate medium subangular blocky structure; firm; common fine roots; neutral; clear wavy boundary.

B3g—26 to 38 inches; gray (10YR 5/1) silty clay loam; few medium distinct dark yellowish brown mottles; moderate medium subangular blocky structure; firm; few fine roots; veins or root fill of dark gray; few calcium carbonate concretions in lower part; neutral; gradual wavy boundary.

B4g—38 to 54 inches; gray (10YR 5/1) silty clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; ped surfaces of dark gray; few black concretions; few calcium carbonate concretions; mildly alkaline; gradual wavy boundary.

C—54 to 68 inches; gray (5Y 5/1) sandy clay loam; common medium distinct olive yellow (5Y 6/8) mottles; massive; friable; veins of dark gray (10YR 4/1); few dark concretions; few calcium carbonate concretions; mildly alkaline.

Solum thickness ranges from 20 to 55 inches. Reaction ranges from slightly acid through mildly alkaline in the A horizon and from slightly acid through moderately alkaline in the B and C horizons.

The A horizon is less than 10 inches thick in more than 70 percent of any pedon but ranges to as much as 12 inches in thickness. It has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. Colors with value of 3 are in the A horizon only where it is less than 6 inches thick. Texture is fine sandy loam or, in a few areas, silt loam.

The B horizon has hue of 10YR, value of 4, 5, or 6, and chroma of 1. Texture is silt loam, silty clay loam, or clay loam. Clay content averages between 25 and 35 percent, and sand content—dominantly very fine sand—averages 10 to 30 percent. Few to common fine or medium yellowish brown and olive brown mottles are throughout the horizon. Concretions of calcium carbonate range from none to common.

The C horizon has hue of 10YR, value of 4, 5, or 6, and chroma of 1, or it has hue of 5Y, value of 4 or 5, and chroma of 1 or 2. It has few to common yellowish brown, olive yellow, and gray mottles. It is sandy clay loam, silt loam, silty clay loam, or clay loam and is thinly stratified in some pedons. There are no to common concretions of calcium carbonate.

Roellen series

The Roellen series consists of poorly drained, slowly permeable, level to depressional soils in slack water areas. These soils formed in beds of clayey sediments. They are flooded less often than once every 2 years. They are saturated late in winter and early in spring. Slope is dominantly less than 1 percent.

Roellen soils are geographically closely associated with Commerce, Mhoon, and Sharkey soils. Commerce and Mhoon soils, which are somewhat higher in elevation, are less clayey. In addition, Commerce soils are better drained and browner. Sharkey soils, which are in slack water areas, lack a mollic epipedon.

Typical pedon of Roellen silty clay loam, in a cultivated area in the SW1/4SE1/4NE1/4 sec. 34, T. 16 N., R. 7 E.:

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) silty clay loam; weak medium and fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A12—4 to 7 inches; very dark gray (10YR 3/1) silty clay; few medium distinct dark brown (7.5YR 4/4) mottles; moderate medium angular blocky structure; firm, sticky, plastic; few fine roots; few slickensides; neutral; clear smooth boundary.

B1g—7 to 18 inches; dark gray (10YR 4/1) silty clay; many medium prominent dark reddish brown (5YR 3/4) mottles; moderate medium angular blocky structure; firm, sticky, plastic; few fine roots; few slickensides; neutral; gradual smooth boundary.

B2g—18 to 44 inches; dark gray (10YR 4/1) silty clay; common medium prominent dark reddish brown (5YR 3/4) mottles; moderate medium angular blocky structure; firm, sticky, plastic; few fine roots; few slickensides; neutral; gradual smooth boundary.

B3g—44 to 60 inches; dark gray (5Y 4/1) silty clay; few fine prominent dark reddish brown mottles; weak medium subangular blocky structure; somewhat firm; silt coats between peds; few fine roots; mildly alkaline; gradual wavy boundary.

IICg—60 to 72 inches; dark gray (5Y 4/1) silt loam; few fine distinct dark yellowish brown (10YR 3/4) and very dark gray (10YR 3/1) mottles; massive; friable; few fine roots; mildly alkaline.

Solum thickness ranges from 30 to 75 inches. Reaction ranges from medium acid to mildly alkaline throughout. Cracks extend into the B horizon during dry periods. There are few to common small slickensides in the A and B horizons.

The A horizon is less than 20 inches thick in more than 60 percent of any pedon but ranges to as much as 40 inches in thickness. It has hue of 10YR, value of 3, and

chroma of 1 or 2, or it has hue of 2.5Y, value of 3, and chroma of 2.

The B horizon has hue of 10YR, value of 4, and chroma of 1 or 2, or it has hue of 5Y, value of 4 or 5, and chroma of 1 or 2. It is clay or silty clay; clay content ranges to as much as about 60 percent. Few to common dark reddish brown and brown mottles are throughout the horizon.

The C horizon has hue of 5Y, value of 4 or 5, and chroma of 1 or 2. It is silty clay loam, silt loam, or loam, and in a few places, fine sandy loam.

Saffell series

The Saffell series consists of well drained, moderately permeable, moderately sloping and moderately steep soils on uplands on Crowleys Ridge. These soils formed in gravelly, loamy water-laid sediments. Slope is 8 to 20 percent. Native vegetation was upland hardwood trees.

Saffell soils are geographically associated with Brandon, Loring, and Memphis soils. Brandon soils, which are mostly on narrow ridge crests and interfluves, have more fines than Saffell soils and few or no pebbles in the upper part of the B horizon. The nearly level to moderately steep Loring and Memphis soils, which are on uplands, formed in thick loess and have base saturation of more than 35 percent at a depth of 50 inches below the upper boundary of the argillic horizon. Loring soils also have a fragipan.

Typical pedon of Saffell gravelly silt loam, in an area of Brandon-Saffell association, moderately steep, in a wooded area in the NW1/4NE1/4NE1/4 sec. 3, T. 13 N., R. 3 E.:

A1—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly silt loam; weak fine granular structure; very friable; many fine roots; about 20 percent by volume pebbles up to 1.5 inches in diameter; very strongly acid; abrupt wavy boundary.

A2—3 to 15 inches; yellowish brown (10YR 5/4) very gravelly silt loam; weak fine to medium granular structure; friable; few fine roots; about 40 percent gravel up to 2 inches in diameter; very strongly acid; clear wavy boundary.

B21t—15 to 27 inches; strong brown (7.5YR 5/6) very gravelly sandy clay loam; weak fine subangular blocky structure; friable; few fine roots; sand grains coated; 50 percent gravel up to 2 inches in diameter; very strongly acid; clear wavy boundary.

B22t—27 to 45 inches; red (2.5YR 4/6) very gravelly sandy clay loam; weak fine subangular blocky structure; friable; few fine roots; thin patchy clay films and sand grains coated and bridged; 50 percent gravel up to 3 inches in diameter; few iron cementations (conglomerate); very strongly acid; clear wavy boundary.

B23t—45 to 58 inches; red (2.5YR 4/6) very gravelly sandy clay loam; weak fine subangular blocky structure; friable; thin patchy clay films; sand grains coated and bridged; 50 percent gravel up to 3 inches in diameter; very strongly acid; clear wavy boundary.

C—58 to 72 inches; red (2.5YR 4/8) gravelly sandy loam; weak medium subangular blocky structure; firm; few fine pebbles (30 percent); very strongly acid.

Solum thickness ranges from 35 to 60 inches. Reaction is strongly acid or very strongly acid throughout the profile.

The A horizon is dominantly less than 11 inches thick but ranges up to 13 inches in thickness. It has hue of 10YR with value of 4 or 5 and chroma of 3, or with value of 4 and chroma of 2. Gravel content ranges from about 2 to 35 percent in the A1 horizon and from 15 to 50 percent in the A2 horizon. Texture of the A horizon is gravelly silt loam or very gravelly silt loam.

The B horizon has hue of 5YR, value of 4 or 5, and chroma of 4 or 6; hue of 7.5YR, value of 5, and chroma of 6; or hue of 2.5YR, value of 4 or 5, and chroma of 6. Gravel content ranges from 35 to 65 percent. Texture is very gravelly fine sandy loam, very gravelly sandy clay loam, or very gravelly loam. In most pedons, sand grains and pebbles are coated and bridged with clay and discontinuous clay films on faces of peds.

The C horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 4 or 5, and chroma of 4, 6, or 8. Gravel content ranges from 20 to 80 percent. Texture is gravelly sandy loam, very gravelly loamy sand, or very gravelly sandy loam.

Sharkey series

The Sharkey series consists of poorly drained, very slowly permeable soils that formed in beds of predominantly clayey sediments. These soils are on broad flats that were once backswamps of former streams. They have a seasonal high water table in late winter and early spring. The native vegetation was hardwood forests. Slope is dominantly less than 1 percent.

Sharkey soils are geographically associated with Commerce, Mhoon, and Roellen soils. Commerce soils, which are on the lower parts of natural levees, have a less clayey control section and are better drained than Sharkey soils. The level to depressional Mhoon soils, which are on flood plains, have a less clayey control section. Roellen soils, which are in slight depressions on flood plains, have a mollic epipedon.

Typical pedon of Sharkey clay, in a cultivated area in the SE1/4SW1/4SW1/4 sec. 16, T. 14 N., R. 6 E.:

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) clay; moderate fine subangular blocky structure; firm, plastic; few fine roots; neutral; abrupt smooth boundary.

B21g—5 to 15 inches; dark gray (10YR 4/1) clay; common to many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; very firm, plastic; few dark concretions; few fine roots; neutral; clear wavy boundary.

B22g—15 to 29 inches; dark gray (10YR 4/1) clay; common medium distinct yellowish brown (10YR 5/6)

mottles; moderate medium subangular blocky structure; very firm, plastic; common dark concretions; few slickensides; few fine roots; mildly alkaline; clear wavy boundary.

B23g—29 to 49 inches; dark gray (10YR 4/1) clay; common medium distinct light olive brown (2.5Y 5/6) mottles; moderate medium subangular blocky structure; very firm, plastic; few slickensides; common dark concretions; few fine roots; mildly alkaline; clear wavy boundary.

B3g—49 to 60 inches; dark gray (5Y 4/1) silty clay loam; common medium distinct light olive brown (2.5Y 5/4) mottles; weak medium subangular blocky structure; firm; mildly alkaline; clear wavy boundary.

C1g—60 to 72 inches; dark gray (5Y 4/1) silt loam; common medium distinct yellowish red (5YR 4/6) mottles; massive to weak medium subangular blocky structure; firm, plastic; common dark concretions; moderately alkaline; clear wavy boundary.

C2g—72 to 80 inches; dark gray (N 4/0) silt loam; few medium distinct light olive brown (2.5Y 5/4) mottles; massive to weak medium subangular blocky structure; friable, plastic; few lenses of very fine sandy loam; moderately alkaline.

Solum thickness ranges from 36 to 60 inches. Reaction is medium acid to moderately alkaline in the A horizon and in the upper part of the B horizon and ranges from neutral to moderately alkaline in the lower part of the B horizon and in the C horizon.

The A horizon ranges from about 3 to 8 inches in thickness. It has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. Texture ranges from silt loam to clay.

The B horizon has hue of 10YR, value of 4 or 5, and chroma of 1, or it has hue of 5Y, value of 4 or 5, and chroma of 1.

The C horizon has hue of 10YR or 5Y, value of 4, 5, or 6, and chroma of 1, or it has neutral hue and value of 4 or 5. Texture is silt loam to clay.

Tichnor series

The Tichnor series consists of poorly drained, slowly permeable, level soils in drainageways on uplands. These soils formed in sediments washed from loess. They have a seasonal high water table in late winter and early spring. Slope is less than 1 percent. Individual areas range from 10 to 200 acres in size. Native vegetation is bottom land hardwoods.

Tichnor soils are geographically associated with Calhoun, Falaya, and Hillemann soils. Calhoun soils, which are on broad flats and in depressions of terraces, have an A horizon less than 24 inches thick. Falaya soils, which are in upland drainageways, are coarse-silty and somewhat poorly drained. Hillemann soils, which are on broad flats, are somewhat poorly drained. In addition, Falaya and Hillemann soils have an A horizon less than 24 inches thick.

Typical pedon of Tichnor silt loam, in a cultivated area in the SW1/4SW1/4NW1/4 sec. 24, T. 13 N., R. 2 E.:

Ap—0 to 4 inches; grayish brown (10YR 5/2) silt loam; few medium distinct yellowish brown (10YR 5/6) mottles; weak fine granular structure; friable; common fine roots; few fine dark concretions; medium acid; abrupt smooth boundary.

A21g—4 to 16 inches; gray (10YR 6/1) silt loam; common medium and fine yellowish brown (10YR 5/6) mottles; some mottles follow root channels; weak medium and coarse granular structure; friable; common fine roots; few pores; few fine dark concretions; strongly acid; clear smooth boundary.

A22g—16 to 32 inches; gray (10YR 6/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; common pores; few small dark concretions; very strongly acid; clear smooth boundary.

B21tg—32 to 44 inches; light gray (10YR 7/1) silty clay loam; few fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; few pores; thin patchy clay films on faces of peds; few fine dark concretions; very strongly acid; clear smooth boundary.

B22tg—44 to 59 inches; light gray (10YR 7/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; few pores; few fine dark concretions; dark stains on faces of some peds; strongly acid; clear smooth boundary.

Cg—59 to 72 inches; light gray (10YR 7/1) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine dark concretions; neutral.

Solum thickness ranges from 40 to 80 inches. Reaction is very strongly acid through medium acid throughout all horizons. Depth to the Bt horizon is 24 to 39 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2. The A2 horizon has hue of 10YR, value of 5, 6, or 7, and chroma of 1.

The B horizon has hue of 10YR, value of 5, 6, or 7, and chroma of 1. Texture is silt loam or silty clay loam. Clay content ranges from about 22 to 35 percent.

The B3 and C horizons, where present, generally have the same color and texture as the B2 horizon. In some pedons, however, the C horizon is of either coarser or finer texture.

Classification of the soils

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to "Soil taxonomy" (*9*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 18, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Alfisols.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aqualfs (*Aqu*, meaning water, plus *alf*, from Alfisols).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Ochraqualfs (*Ochr*, meaning pale surface, plus *aqualfs*, the suborder of Alfisols that have an aquic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that is thought to typify the great group. An example is Typic Ochraqualfs.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-silty, mixed, thermic, Typic Ochraqualfs.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Formation of the soils

In this section the factors of soil formation are discussed and related to the soils in the survey area. In addition, the processes of soil formation are described.

Factors of soil formation

Soil is a natural, three-dimensional body on the earth's surface. It supports plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

The interaction of five main factors results in differences among the soils. These factors are the physical and chemical composition of the parent material, the climate during and after the accumulation of the parent material, the kind of plants and organisms living in the soil, the relief of the land and its effect on runoff, and the length of time it took the soil to form (*6*).

The effect of a factor can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. In the following paragraphs the factors of soil formation are discussed as they relate to the soils in the survey area.

Climate

The climate of Craighead County is characterized by mild winters, warm or hot summers, and generally abundant rainfall. The generally warm temperatures and high precipitation probably are similar to the climate under which the soils in the county formed. The average daily maximum temperature at Jonesboro in July is about 92 degrees F, and the average in January is about 48 degrees F. The total annual rainfall, about 48 inches, is well distributed throughout the year. For additional information about the climate, refer to the section "General nature of the county."

The warm, moist climate promotes rapid soil formation, and the warm temperature encourages rapid chemical reactions. The large amount of water that moves through the soil is instrumental in removing dissolved or suspended materials. Because remains of plants decompose rapidly, the organic acids thus formed hasten the formation of clay minerals and removal of carbonates. Because the soil is frozen only to shallow depths and for short periods, soil formation continues almost the year round. The climate

throughout the county is uniform, though its effect is modified locally by runoff. Climate alone does not account for differences in the soils of the county.

Living organisms

The higher plants and animals, as well as insects, bacteria, and fungi, are important in the formation of soils. Among the changes they cause are gains in organic matter and nitrogen in the soil, gains or losses in plant nutrients, and changes in structure and porosity.

Before Craighead County was settled, the native vegetation had more influence on soil formation than did animal activity.

On the flood plains the trees were mainly hardwoods. In areas of frequently flooded Commerce, Mhoon, and Sharkey soils were good stands of baldcypress and water tupelo. On the flood plains and natural levees, where Amagon, Beulah, Collins, Convent, Dubbs, Dundee, Falaya, Jackport, Roellen, and Tichnor soils formed, the trees were chiefly oaks, sweetgum, ash, sycamore, pecan, and hickory.

On the uplands, where Loring, Memphis, and Brandon soils formed, the forests were mainly mixed stands of shortleaf and loblolly pines, oaks, sweetgum, and hickory.

As agriculture has developed in Craighead County, man's influence on soil formation has increased. By clearing forests and tilling the soil; by introducing new plants; by fertilizing; by adding chemicals for insect, disease, and weed control; and by improving drainage and controlling floods, man is changing the direction of soil formation. Even in many of the areas that have remained in woodland, man is influencing soil formation through woodland management practices such as selective harvesting, timber stand improvement, and planting pure stands of preferred species. Only a few results of man's activities can be seen now. These include changes in structure, color, organic-matter content, nutrient content, and thickness of the surface horizon or plow layer. Many results of man's activities will probably not be evident for several centuries.

Parent material

The soils of Craighead County formed in water-deposited alluvium and wind-transported loess.

The alluvium was deposited by the Mississippi River (*3*) when it flowed in the channels now occupied by the Black and Cache Rivers. The alluvium consists of a mixture of minerals washed from the many kinds of soil, rocks, and unconsolidated sediments in about 24 states (*11*). In this great basin, which extends from Montana to Pennsylvania, sedimentary rocks of various kinds are widespread. Other kinds of rocks also are exposed in many places and serve as sediment sources. Large areas of the upper basin are mantled by glacial drift and loess. Consequently, the alluvium consists of many kinds of minerals, most of which are only slightly weathered.

The wide range in texture of alluvium in the county results from differences in the site of deposition. When a river overflows and spreads over its flood plain, the coarse sediments are deposited in bands roughly parallel to the channel. Thus, low ridges known as natural levees are formed (*11*). On these ridges, Beulah, Bruno, Dubbs, and Dundee soils formed. Finer sediments, high in silt content, are deposited as the floodwaters spread and lose velocity. These sediments contain some sand and clay. Here, soils such as Commerce, Convent, and Fountain formed. When the flood recedes and water is left standing as shallow lakes or swamps, the clay and finer silt settle. In these sediments Roellen, Sharkey, and Jackport soils formed.

This simple pattern of sediment distribution is not now common along the river bottom lands because through the centuries the river channel has meandered back and forth across the flood plain. Sometimes the channel has cut out all or parts of natural levees. At other times it has deposited sandy or loamy sediments over slack water clays, or slack water clays over sandy or loamy sediments. The natural pattern of sediment distribution from a single channel has been truncated in many places, and more recent beds of alluvium have been superimposed. Parts of former stream channels have been filled and are now wide, flat-bottomed depressions in which Amagon soils formed.

During much of the Pleistocene Epoch, the Mississippi River flood plain was west of Crowleys Ridge, and the Ohio River flowed on the east side of the ridge (*3*).

Thousands of years ago the wide trough carved west of Crowleys Ridge was partially refilled with sediments by the Mississippi River in much the same manner as the river deposits of Recent time were laid down. Finally, the vast complex of alluvial terraces west of the Ridge was abandoned by the Mississippi River in favor of the Ohio River channel on the east side of the ridge. The broad, abandoned flood plain was subsequently drained by smaller streams that occupied former braided channels of the Mississippi. These smaller streams were inadequate to maintain the entire area as an active flood plain. Those parts of the plain above overflow were progressively mantled with loesslike material or loamy sediments.

The soils on the uplands of the county formed in loess deposited during the Pleistocene Epoch. This mantle of wind-transported material was deposited over older alluvium. On the uplands the mantle is thick enough that the solum of most soils formed entirely in loess. Generally, the loess is about 2 to 20 feet thick. It is unstratified and is composed mainly of silt-sized particles. On the level parts of the plain, poorly drained soils such as Calhoun formed. In the nearly level to steep areas, moderately well drained and well drained soils such as Loring and Memphis formed. The somewhat poorly drained Hillemann soils formed at intermediate positions between these extremes.

In places are Foley and Lafe soils, which formed in soil material containing large amounts of sodium and magnesium.

The loess in Craighead County is typical of the loess on the Southern Mississippi Valley Silty Uplands. Most soils formed in the loess are acid, though the content of bases is moderately high.

Relief

Relief is the inequalities in elevation of a land surface. The other soil-forming factors are affected by relief through its effect on drainage, runoff, erosion, and percolation of water through the soil. Some of the greatest differences among the soils are due mainly to differences in relief.

The bottom land area of Craighead County has relief ranging from broad flats to undulating areas of alternating swales and low ridges. Local differences in relief are usually less than 1 foot on the flats and range up to 3 feet in the areas of swales and low ridges. In a few areas of minor extent, differences in elevation are as much as 8 feet. The highest elevation in the bottom land area, about 255 feet above sea level, is in the west-central part of the county on the Craighead-Jackson County line. The lowest elevation, about 215 feet above sea level, is in the southeastern part of the county.

The upland area, a part of Crowleys Ridge 2 to 15 miles wide, traverses the county from the north-central part to the south-central part. The relief of the uplands is characterized by ridges with narrow, winding tops; short to long side slopes; and narrow valleys between the ridges. Gradient ranges from 1 to 40 percent. The highest point above sea level in the uplands is about 500 feet, and the lowest, about 260 feet on Crowleys Ridge.

Time

The length of time required for formation of a soil depends largely upon other factors of soil formation. Less time generally is required if the climate is warm and humid and the vegetation is luxuriant. If other factors are equal, less time also is required where the parent material is sandy or loamy than where it is clayey.

It seems probable that the sediments now forming most of the land surface in Craighead County were deposited during and after the advance of the continental glaciers. The last of these glaciers retreated from the North-Central States about 11,000 years ago (*4, 5*). Thus, in terms of geological time, the soils in Craighead County are young.

In terms of soil formation, the ages of the soils in the county vary widely. On the smoother parts of the uplands, the soils are more mature, but on the stronger slopes where geologic erosion has more nearly kept pace with soil formation, the soils have less thick, less strongly developed horizons. On young natural levees and in areas of local alluvium, the soil material has been in place so short a time that the soils show relatively little evidence of development. Many such areas receive fresh deposits of sediments at frequent intervals. In these areas are such soils as Commerce, Collins, and Falaya.

Processes of soil formation

The marks that the soil-forming factors leave on the soil are recorded in the soil profile. The profile is a succession of layers (horizons) that extend from the surface to the parent material, which has been altered little by soil-forming processes. The horizons differ in one or more properties, such as color, texture, structure, consistence, porosity, and reaction. Most soil profiles contain three major horizons, called A, B, and C. Very young soils do not have a B horizon.

The A horizon can be the horizon of maximum accumulation of organic matter and called the A1 horizon, or the surface layer, or it can be the horizon of maximum leaching of dissolved or suspended materials and called the A2 horizon, or the subsurface layer.

The B horizon lies immediately beneath the A horizon and is sometimes called the subsoil. It is a horizon of maximum accumulation of dissolved or suspended material such as iron and clay. Commonly, the B horizon has blocky structure (*10*) and is firmer than the horizons immediately above and below it.

Beneath the B horizon is the C horizon, which has been affected little by the soil-forming processes, although the C horizon can be materially modified by weathering. In some young soils, the C horizon immediately underlies the A horizon and has been slightly modified by living organisms as well as by weathering.

Several processes have been active in the formation of horizons in the soils of Craighead County. Among these processes are the accumulation of organic matter, the leaching of calcium carbonates and bases, the reduction and transfer of iron, and the formation and translocation of silicate clay minerals. In most of the soils of this county, more than one of these processes has been active in soil formation.

Accumulation of organic matter in the upper part of the profile to form an A1 horizon has been an important process of soil formation. The soils of Craighead County range from high to low in content of organic matter.

Leaching of carbonates and bases has occurred to some degree in nearly all the soils of Craighead County. Among soil scientists, it is generally accepted that bases are leached downward in soils before silicate clay minerals begin to move. Some of the soils are only slightly leached, but most of the soils in the county are moderately leached. This is an important factor in horizon development.

Reduction and transfer of iron has occurred to a significant degree in the somewhat poorly drained and poorly drained soils of the county. In the naturally wet soils, this process is called gleying. Gray colors in the layers below the surface indicate the reduction and loss of iron. Some horizons contain reddish or yellowish mottles and concre-

tions derived from segregated iron. Gleying is pronounced in many of the soils. Among the strongly gleyed soils are Amagon, Calhoun, Jackport, and Sharkey soils.

In several soils of Craighead County, the translocation of clay minerals has contributed to the formation of horizons. In most places the eluviated A2 horizon has been destroyed by cultivation, but where an A2 horizon occurs, its structure is blocky to platy, clay content is less than in the lower horizons, and the soil is lighter. Generally, clay films have accumulated in pores and on surfaces of peds in the B horizon. The soils were probably leached of carbonates and soluble salts to a great extent before translocation of silicate clay occurred, even though the content of bases is still high in all soils of the county.

Leaching of bases and translocation of silicate clay are among the most important processes in horizon differentiation in the soils of Craighead County.

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Glossary

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Medium	6 to 9
High	More than 9

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bottom land. The normal flood plain of a stream, subject to frequent flooding.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control wind erosion.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan

is commonly hard when dry and plastic or stiff when wet.

Coarse fragments. Mineral or rock particles up to 3 inches (2 millimeters to 7.5 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the bases of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water control measures is difficult.

Complex, soil. A map unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Compressible. Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is 40 or 80 inches (1 or 2 meters).

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave. Unstable walls of cuts made by earth-moving equipment. The soil sloughs easily.

Delta. An alluvial deposit, commonly triangular in shape, formed largely beneath water and deposited at the mouth of a river or stream.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially

drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Excess alkali. Excess exchangeable sodium. The resulting poor physical properties restrict the growth of plants.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forage. Plant material used as feed by domestic animals. Forage can be grazed or cut for hay.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material from 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the

overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered, but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. Inadequate strength for supporting loads.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous areas. Areas that have little or no natural soil, are too nearly inaccessible for orderly examination, or cannot otherwise be feasibly classified.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Phase, soil. A subdivision of a soil series or other unit in the soil classification system based on differences in the soil that affect its management. A soil series, for

example, may be divided into phases on the bases of differences in slope, stoniness, thickness, or some other characterisitc that affects management. These differencees are too small to justify separate series.

pH value. (See Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Piping. Moving water of subsurface tunnels or pipelike cavities in the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Poorly graded. Refers to soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor outlets. Surface or subsurface drainage outlets difficult or expensive to install.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rooting depth. Shallow root zone. The soil is shallow over a layer that greatly restricts roots. See Root zone.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slick spot. Locally, a small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake. The slow movement of water into the soil.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: *very coarse sand* (2.0 millimeters to 1.0 millimeter); *coarse sand* (1.0 to 0.5 millimeter); *medium sand* (0.5 to 0.25 millimeter); *fine sand* (0.25 to 0.10 millimeter); *very fine sand* (0.10 to 0.05 millimeter); *silt* (0.005 to 0.002 millimeter); and *clay* (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the mate-

rial in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Stratified. Arranged in strata, or layers. The term refers to geologic material. Layers in soils that result from the processes of soil formation are called horizons; those inherited from the parent material are called strata.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a lighter leached horizon that is lower in content of organic matter than the overlying surface layer.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or " very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to a soil or soil material consisting of particles well distributed over a wide range in size or diameter. Such a soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Illustrations

Figure 1.—Soybeans on Amagon silt loam. Crowleys Ridge is in the background.

Figure 2.—Profile of Brandon silt loam in an area of Brandon-Saffell association, moderately sloping. The surface layer and subsoil are wind-laid sediment, and the underlying material is gravelly sediment.

Figure 3.—These pine trees planted in an abandoned gravel pit in an area of Brandon-Saffell association, moderately steep, help control erosion.

Figure 4.—A good stand of rice on Calhoun silt loam. The dark streaks through the rice are water-control levees.

Figure 5.—Young cotton on Commerce very fine sandy loam. This soil is one of the more productive in the county.

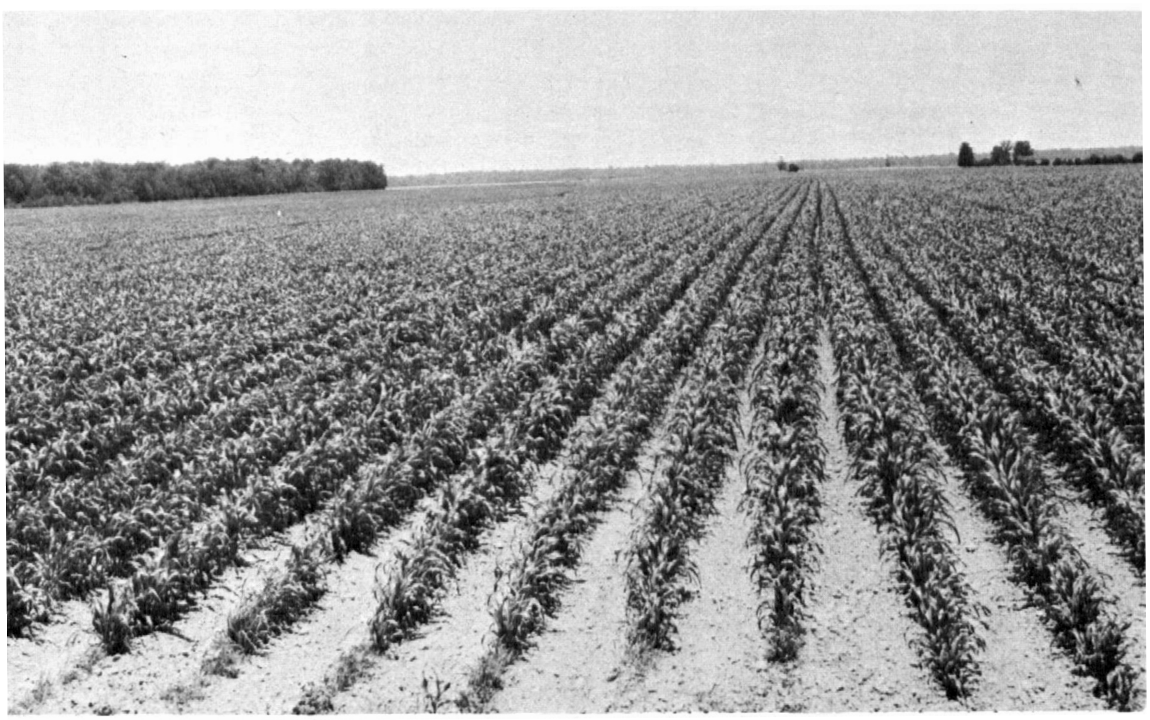


Figure 6.—Grain sorghum on Dubbs fine sandy loam, gently undulating.

Figure 7.—Irrigated cotton on Hillemann silt loam.

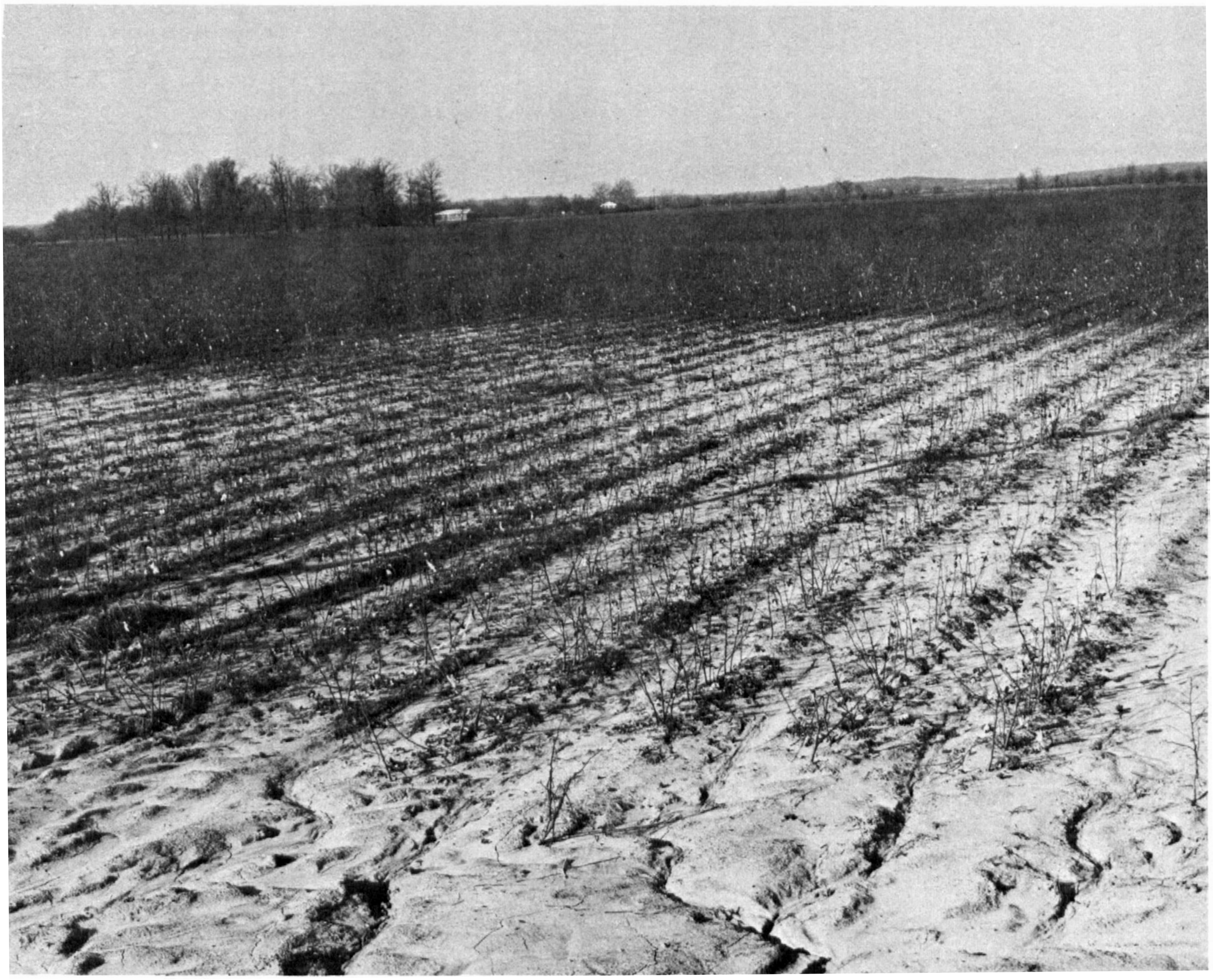


Figure 8.—This cotton is in an area of Lafe silt loam (foreground) and Foley soils (background). Lafe silt loam is poorly suited to row crops because of droughtiness and high concentrations of sodium and magnesium in the subsoil.

Figure 9.—Pasture on Loring silt loam, 8 to 12 percent slopes. For best results, grazing needs to be controlled on pasture on this soil.

Figure 10.—Sharkey soils, frequently flooded, are covered with water for several months in most years.

Tables

TABLE 1.--ACREAGE OF PRINCIPAL CROPS AND PASTURE IN STATED YEARS

Crops	Acres in 1974	Acres in 1969
Soybeans (for beans)	156,509	208,689
Cotton	83,858	77,921
Rice	33,926	19,923
Wheat	17,826	17,647
Cropland used only for pasture	13,316	20,646
Hay (excluding sorghum hay and grass silage*	3,702	2,368

*Excludes hay and pasture acreage on levees.

TABLE 2.--NUMBER OF LIVESTOCK IN STATED YEARS

Livestock	Number in 1974	Number in 1969
All cattle and calves	11,206	9,484
Beef cows	4,952	4,266
Milk cows	147	161
Hogs and pigs	4,734	7,316
Chickens*	105,348	121,902

*Three months old or older.

TABLE 3.--TEMPERATURE AND PRECIPITATION DATA

[Data were recorded in the period 1951-74 at Jonesboro, Arkansas]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	48.1	30.1	39.1	73	6	8	3.94	1.90	5.59	7	1.9
February---	51.9	33.2	42.6	74	10	29	4.13	1.99	5.86	7	2.2
March------	60.5	40.3	50.4	82	19	155	5.02	2.36	7.18	8	2.1
April------	72.6	51.1	61.9	89	31	362	5.16	2.98	6.93	8	.0
May--------	81.3	59.6	70.5	94	41	636	4.93	2.73	6.72	7	.0
June-------	89.1	67.5	78.3	100	52	849	3.03	1.21	4.50	6	.0
July-------	91.9	70.8	81.4	103	57	973	3.72	1.79	5.29	6	.0
August-----	90.7	68.9	79.8	101	55	924	3.24	1.44	4.70	5	.0
September--	84.1	62.0	73.1	98	44	693	3.64	1.24	5.54	5	.0
October----	75.1	50.7	62.9	92	32	407	2.47	0.77	3.83	4	.0
November---	60.9	40.4	50.6	81	19	97	4.63	2.25	6.56	6	.3
December---	50.4	33.4	41.9	72	9	29	4.22	2.43	5.68	7	.8
Year-----	71.4	50.7	61.0	104	4	5,162	48.13	40.42	55.50	76	7.3

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 4.--FREEZE DATES IN SPRING AND FALL

[Data were recorded in the period 1951-74 at Jonesboro, Arkansas

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 21	March 29	April 13
2 years in 10 later than--	March 14	March 24	April 8
5 years in 10 later than--	March 2	March 15	March 29
First freezing temperature in fall:			
1 year in 10 earlier than--	November 9	October 29	October 24
2 years in 10 earlier than--	November 16	November 4	October 28
5 years in 10 earlier than--	November 30	November 14	November 6

TABLE 5.--GROWING SEASON LENGTH

[Data were recorded in the period 1951-74 at Jonesboro, Arkansas]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	245	223	201
8 years in 10	255	230	208
5 years in 10	272	244	221
2 years in 10	290	257	235
1 year in 10	299	265	242

TABLE 6.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Amagon fine sandy loam	4,671	1.0
2	Amagon silt loam	19,620	4.2
3	Beulah fine sandy loam, 0 to 1 percent slopes	7,278	1.6
4	Beulah fine sandy loam, gently undulating	1,737	0.4
5	Brandon-Saffell association, moderately sloping	1,447	0.3
6	Brandon-Saffell association, moderately steep	7,645	1.7
7	Bruno loamy sand	1,959	0.4
8	Calhoun silt loam	26,662	5.8
9	Calloway silt loam, 0 to 1 percent slopes	11,258	2.5
10	Calloway silt loam, 1 to 3 percent slopes	5,316	1.2
11	Collins silt loam, occasionally flooded	22,281	4.9
12	Commerce very fine sandy loam	22,793	5.0
13	Commerce soils, frequently flooded	2,317	0.5
14	Convent fine sandy loam	3,347	0.7
15	Dubbs fine sandy loam, 0 to 1 percent slopes	9,649	2.1
16	Dubbs fine sandy loam, gently undulating	6,680	1.5
17	Dubbs silt loam, 0 to 1 percent slopes	3,626	0.8
18	Dundee fine sandy loam	28,713	6.3
19	Dundee silt loam	3,213	0.7
20	Dundee-Bruno-Commerce complex	13,489	2.9
21	Falaya silt loam, occasionally flooded	18,034	3.9
22	Foley silt loam	32,610	7.1
23	Fountain silt loam	27,621	6.0
24	Grenada silt loam, 1 to 3 percent slopes	6,363	1.4
25	Henry silt loam	15,426	3.4
26	Hillemann silt loam	27,481	6.0
27	Jackport silty clay loam	17,624	3.8
28	Lafe silt loam	2,580	0.6
29	Loring silt loam, 1 to 3 percent slopes	2,899	0.6
30	Loring silt loam, 3 to 8 percent slopes	16,301	3.6
31	Loring silt loam, 8 to 12 percent slopes	19,281	4.2
32	Memphis silt loam, 12 to 40 percent slopes	6,970	1.5
33	Memphis soils, 8 to 40 percent slopes, gullied	561	0.1
34	Mhoon fine sandy loam	22,314	4.9
35	Mhoon soils, frequently flooded	5,134	1.1
36	Roellen silty clay loam	7,692	1.7
37	Sharkey clay	7,168	1.6
38	Sharkey soils, frequently flooded	11,885	2.6
39	Tichnor silt loam	2,844	0.6
40	Udorthents	584	0.1
	Water (areas of less than 40 acres and streams less than 1/8 mile wide)	3,254	0.7
	Total (land area)	458,327	100.0

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Cotton lint	Soybeans	Wheat	Rice	Bahiagrass	Common bermuda-grass	Tall fescue
	Lb	Bu	Bu	Bu	AUM*	AUM*	AUM*
1, 2 Amagon	650	35	---	120	---	7.5	9.0
3 Beulah	600	35	45	---	6.0	6.0	7.0
4 Beulah	550	30	45	---	5.0	5.0	7.0
5**:							
Brandon	---	30	30	---	---	---	---
Saffell	---	---	---	---	4.5	3.5	---
6**:							
Brandon	---	---	---	---	---	---	---
Saffell	---	---	---	---	4.0	3.0	---
7*** Bruno	450	---	30	---	---	5.0	---
8 Calhoun	400	25	---	120	6.5	5.0	6.0
9 Calloway	650	35	---	120	---	6.0	8.0
10 Calloway	650	35	---	---	---	6.5	8.5
11 Collins	800	40	40	---	---	8.0	10.0
12 Commerce	900	40	---	---	8.5	8.0	---
13 Commerce	---	---	---	---	---	---	---
14 Convent	875	40	---	---	---	8.0	---
15 Dubbs	850	40	45	---	---	9.0	10.0
16 Dubbs	800	35	40	---	---	9.0	10.0
17 Dubbs	850	40	45	---	---	9.0	10.0
18, 19 Dundee	750	40	---	---	---	9.0	9.0
20*** Dundee	715	---	---	---	---	---	---
21 Falaya	750	40	36	---	7.5	7.0	8.0
22 Foley	650	30	40	120	---	6.0	8.0

See footnotes at end of table.

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Cotton lint	Soybeans	Wheat	Rice	Bahiagrass	Common bermuda-grass	Tall fescue
	Lb	Bu	Bu	Bu	AUM*	AUM*	AUM*
23----------------------- Fountain	---	30	---	---	8.0	7.0	---
24----------------------- Grenada	600	35	---	---	8.0	7.0	8.0
25----------------------- Henry	625	35	---	---	---	5.5	---
26----------------------- Hillemann	600	35	40	120	---	7.0	7.0
27----------------------- Jackport	550	35	---	130	---	7.0	8.0
28----------------------- Lafe	---	---	---	---	---	3.5	---
29----------------------- Loring	700	30	40	---	8.0	8.0	8.0
30----------------------- Loring	650	25	35	---	7.5	7.5	7.5
31----------------------- Loring	500	20	30	---	7.0	7.0	7.0
32, 33------------------- Memphis	---	---	---	---	---	4.5	---
34----------------------- Mhoon	700	35	---	125	---	8.5	8.0
35----------------------- Mhoon	---	---	---	---	---	7.0	7.0
36----------------------- Roellen	500	35	30	125	---	---	---
37----------------------- Sharkey	600	35	---	130	---	6.5	9.0
38----------------------- Sharkey	---	---	---	---	---	5.0	---
39----------------------- Tichnor	---	35	---	120	---	8.0	9.0
40**. Udorthents							

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

*** Yields are for areas protected from flooding.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available. Site index was calculated at age 30 for eastern cottonwood, at age 35 for American sycamore, and at age 50 for all other species.

Soil name and map symbol	Woodland suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
1, 2: Amagon	1w6	Slight	Severe	Moderate	Eastern cottonwood	100	Eastern cottonwood,
					Water oak	100	cherrybark oak,
					Willow oak	100	Nuttall oak,
					Cherrybark oak	90	Shumard oak,
					Nuttall oak	100	water oak,
					Green ash	80	willow oak,
					Sweetgum	100	sweetgum,
							American sycamore.
3, 4: Beulah	2o4	Slight	Slight	Slight	Eastern cottonwood	100	Eastern cottonwood,
					Cherrybark oak	90	cherrybark oak,
					Nuttall oak	90	Nuttall oak,
					Water oak	90	Shumard oak,
					Willow oak	---	water oak,
					American sycamore	---	willow oak,
							American sycamore.
5*:							
Brandon	3o7	Slight	Slight	Slight	Black oak	70	Shortleaf pine,
					Shortleaf pine	60	loblolly pine,
					Loblolly pine	70	yellow-poplar.
Saffell	4f8	Slight	Slight	Moderate	Loblolly pine	70	Loblolly pine,
					Shortleaf pine	60	shortleaf pine,
					Eastern redcedar	---	eastern redcedar.
6*:							
Brandon	3r8	Moderate	Moderate	Slight	Black oak	70	Shortleaf pine,
					Shortleaf pine	60	loblolly pine,
					Loblolly pine	70	yellow-poplar.
Saffell	4f8	Slight	Slight	Moderate	Loblolly pine	70	Loblolly pine,
					Shortleaf pine	60	shortleaf pine,
					Eastern redcedar	---	eastern redcedar.
7: Bruno	2s5	Slight	Moderate	Moderate	Cherrybark oak	115	Cherrybark oak,
					Water oak	105	Shumard oak,
					Sweetgum	110	chestnut oak,
					Willow oak	88	willow oak,
					River birch	---	sweetgum,
							yellow-poplar.
8: Calhoun	3w9	Slight	Severe	Moderate	Loblolly pine	80	Loblolly pine.
					Shortleaf pine	---	
					Sweetgum	---	
9, 10: Calloway	3w8	Slight	Moderate	Slight	Cherrybark oak	80	Loblolly pine,
					Loblolly pine	80	sweetgum.
					Shortleaf pine	70	
					Sweetgum	80	
					Water oak	80	
11: Collins	1o7	Slight	Slight	Slight	Green ash	95	Green ash,
					Eastern cottonwood	115	eastern cottonwood,
					Cherrybark oak	110	cherrybark oak,
							yellow-poplar,
							loblolly pine.
12, 13*: Commerce	1w5	Slight	Moderate	Slight	Green ash	80	Eastern cottonwood,
					Eastern cottonwood	120	American sycamore,
					Nuttall oak	90	Nuttall oak,
					Water oak	110	water oak.
					Pecan	---	
					American sycamore	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
14 Convent	1w5	Slight	Moderate	Slight	Green ash	80	Eastern cottonwood, American sycamore, Nuttall oak, sweetgum.
					Eastern cottonwood	120	
					Sweetgum	110	
					American sycamore	---	
					Nuttall oak	90	
					Water oak	---	
					Pecan	---	
15, 16, 17 Dubbs	2o4	Slight	Slight	Slight	Cherrybark oak	100	Eastern cottonwood, green ash, Nuttall oak, sweetgum, American sycamore, yellow-poplar, cherrybark oak.
					Eastern cottonwood	100	
					Green ash	80	
					Nuttall oak	95	
					Shumard oak	100	
					Sweetgum	95	
					Water oak	90	
					Willow oak	95	
18, 19 Dundee	2w5	Slight	Moderate	Slight	Cherrybark oak	105	Cherrybark oak, eastern cottonwood, sweetgum, water oak, yellow-poplar.
					Eastern cottonwood	100	
					Sweetgum	100	
					Water oak	95	
20*:							
Dundee	2w5	Slight	Moderate	Slight	Cherrybark oak	105	Cherrybark oak, eastern cottonwood, sweetgum, water oak, yellow-poplar.
					Eastern cottonwood	100	
					Sweetgum	100	
					Water oak	95	
Bruno	2s5	Slight	Moderate	Moderate	Cherrybark oak	115	Cherrybark oak, Shumard oak, chestnut oak, willow oak, sweetgum, yellow-poplar, water oak.
					Water oak	105	
					Sweetgum	110	
					Willow oak	90	
					River birch	---	
Commerce	1w5	Slight	Moderate	Slight	Green ash	80	Eastern cottonwood, American sycamore, Nuttall oak, water oak.
					Eastern cottonwood	120	
					Nuttall oak	90	
					Water oak	110	
					Pecan	---	
					American sycamore	---	
21 Falaya	1w8	Slight	Moderate	Slight	Green ash	90	Green ash, eastern cottonwood, cherrybark oak, Nuttall oak, sweetgum, yellow-poplar.
					Eastern cottonwood	100	
					Cherrybark oak	100	
					Nuttall oak	110	
					Water oak	100	
					Loblolly pine	100	
22 Foley	3w9	Slight	Severe	Moderate	Sweetgum	80	Sweetgum, American sycamore, loblolly pine.
					Cherrybark oak	80	
					Water oak	80	
					Loblolly pine	60	
23 Fountain	2w9	Slight	Severe	Moderate	Sweetgum	---	Sweetgum, loblolly pine.
					Water oak	---	
					Loblolly pine	90	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Woodland suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
24----------------- Grenada	3o7	Slight	Slight	Slight	Cherrybark oak-------- Southern red oak----- Loblolly pine-------- Shortleaf pine------- Sweetgum------------	85 80 85 75 80	Cherrybark oak, Shumard oak, water oak, loblolly pine, white oak, shortleaf pine, slash pine, sweetgum.
25----------------- Henry	3w9	Slight	Severe	Severe	Loblolly pine-------- Shortleaf pine------- Sweetgum------------	80 --- ---	Loblolly pine.
26----------------- Hillemann	3w2	Slight	Moderate	Moderate	Sweetgum------------ Water oak-----------	85 80	Sweetgum, loblolly pine.
27----------------- Jackport	2w6	Slight	Severe	Moderate	Green ash----------- Cherrybark oak------- Water oak----------- Willow oak---------- Sweetgum------------	80 90 90 90 90	Green ash, eastern cottonwood, Nuttall oak, willow oak, sweetgum, American sycamore.
29, 30, 31--------- Loring	3o7	Slight	Slight	Slight	Cherrybark oak------- Sweetgum------------ Southern red oak----- Loblolly pine-------- Water oak-----------	86 90 74 85 82	Loblolly pine, yellow-poplar, southern red oak.
32, 33------------- Memphis	2r8	Slight	Moderate	Slight	Cherrybark oak------- Loblolly pine-------- Black oak----------- Southern red oak----- Yellow-poplar-------- Shortleaf pine-------	90 90 90 80 --- ---	Cherrybark oak, loblolly pine, shortleaf pine, yellow-poplar.
34, 35*------------ Mhoon	1w6	Slight	Severe	Moderate	Green ash----------- Eastern cottonwood--- Water oak----------- Cherrybark oak------- Sweetgum------------ American sycamore----	90 110 --- --- 100 ---	Eastern cottonwood, American sycamore, Nuttall oak, sweetgum.
36----------------- Roellen	2w6	Slight	Severe	Slight	Eastern cottonwood--- Sweetgum------------ Water oak----------- Cherrybark oak-------	100 90 90 90	Eastern cottonwood, sweetgum, Nuttall oak, water oak.
37----------------- Sharkey	2w6	Slight	Severe	Moderate	Green ash----------- Eastern cottonwood--- Cherrybark oak------- Sweetgum------------ Water oak----------- Pecan--------------- American sycamore----	85 100 90 90 90 --- ---	Eastern cottonwood, American sycamore, sweetgum. Nuttall oak, water oak.
38*---------------- Sharkey	3w6	Slight	Severe	Severe	Green ash----------- Eastern cottonwood--- Nuttall oak----------	--- --- 80	Eastern cottonwood, sweetgum, Nuttall oak.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Wood-land suita-bility group	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Important trees	Site index	
39: Tichnor	1w6	Slight	Severe	Moderate	Eastern cottonwood Nuttall oak Cherrybark oak Sweetgum Water oak	105 100 90 100 90	Eastern cottonwood, Nuttall oak, cherrybark oak, sweetgum, American sycamore, green ash, water oak.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
1, 2 Amagon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.
3, 4 Beulah	Severe: cutbanks cave, too sandy.	Slight	Slight	Slight	Slight.
5*:					
Brandon	Severe: small stones, cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.
Saffell	Severe: small stones.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
6*:					
Brandon	Severe: slope, small stones, cutbanks cave.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Saffell	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
7 Bruno	Severe: too sandy.	Slight	Slight	Slight	Slight.
8 Calhoun	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
9, 10 Calloway	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, corrosive.	Moderate: wetness, low strength.
11 Collins	Severe: floods.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Severe: floods.
12 Commerce	Severe: wetness.	Moderate: wetness, low strength, shrink-swell.	Severe: wetness.	Moderate: wetness, low strength, shrink-swell.	Moderate: wetness, low strength, shrink-swell.
13* Commerce	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Severe: floods.
14 Convent	Severe: wetness, cutbanks cave.	Moderate: low strength, wetness.	Severe: wetness.	Moderate: low strength, wetness.	Moderate: low strength, wetness.
15, 16, 17 Dubbs	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.
18, 19 Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
20*:					
Dundee	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.
Bruno	Severe: too sandy.	Slight	Slight	Slight	Slight.
Commerce	Severe: wetness.	Moderate: wetness, low strength, shrink-swell.	Severe: wetness.	Moderate: wetness, low strength, shrink-swell.	Moderate: wetness, low strength, shrink-swell.
21 Falaya	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
22 Foley	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.
23 Fountain	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
24 Grenada	Moderate: wetness.	Moderate: wetness, low strength.	Moderate: wetness, low strength.	Moderate: corrosive, wetness, low strength.	Moderate: low strength, wetness.
25 Henry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.
26 Hillemann	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.
27 Jackport	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.
28 Lafe	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.
29 Loring	Moderate: low strength, wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.
30 Loring	Moderate: low strength, wetness.	Moderate: low strength.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: low strength.
31 Loring	Moderate: slope, wetness, low strength.	Moderate: slope, low strength.	Moderate: slope, low strength.	Severe: slope.	Moderate: slope, low strength.
32, 33* Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
34 Mhoon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.
35* Mhoon	Severe: wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, low strength, floods.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
36----------------- Roellen	Severe: wetness, too clayey, floods.	Severe: wetness, floods, shrink-swell.	Severe: shrink-swell, floods, wetness.	Severe: shrink-swell, floods, wetness.	Severe: shrink-swell, wetness.
37----------------- Sharkey	Severe: wetness, too clayey.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.	Severe: wetness, low strength, shrink-swell.
38*---------------- Sharkey	Severe: wetness, too clayey.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.
39----------------- Tichnor	Severe: floods, wetness.	Severe: floods, low strength, wetness.	Severe: floods, low strength, wetness.	Severe: floods, low strength, wetness.	Severe: floods, low strength, wetness.
40*. Udorthents					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1, 2 Amagon	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
3, 4 Beulah	Slight	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Fair: thin layer, too sandy.
5*:					
Brandon	Moderate: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: seepage.	Fair: thin layer, slope.
Saffell	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Poor: small stones.
6*:					
Brandon	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope.
Saffell	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope, small stones.
7 Bruno	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
8 Calhoun	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
9 Calloway	Severe: percs slowly, wetness.	Slight	Moderate: wetness, percs slowly.	Moderate: wetness.	Good.
10 Calloway	Severe: percs slowly, wetness.	Moderate: slope.	Moderate: wetness, percs slowly.	Moderate: wetness.	Good.
11 Collins	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Good.
12 Commerce	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
13* Commerce	Severe: floods, percs slowly, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Fair: too clayey.
14 Convent	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Good.
15, 16, 17 Dubbs	Moderate: percs slowly.	Moderate: seepage.	Slight	Slight	Fair: too clayey.
18, 19 Dundee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
20*:					
Dundee	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Bruno	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: too sandy.
Commerce	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
21 Falaya	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
22 Foley	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
23 Fountain	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
24 Grenada	Severe: percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Good.
25 Henry	Severe: percs slowly, wetness.	Slight	Severe: percs slowly, wetness.	Severe: wetness.	Poor: wetness.
26 Hillemann	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Fair: too clayey.
27 Jackport	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
28 Lafe	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: hard to pack, thin layer.
29, 30 Loring	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
31 Loring	Severe: percs slowly.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
32 Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
33* Memphis	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
34 Mhoon	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
35* Mhoon	Severe: percs slowly, wetness, floods.	Severe: wetness, floods.	Severe: floods, wetness.	Severe: wetness, floods.	Poor: wetness.
36 Roellen	Severe: percs slowly, floods, wetness.	Severe: wetness, floods.	Severe: wetness, too clayey, floods.	Severe: wetness, floods.	Poor: wetness, too clayey.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
37------------------ Sharkey	Severe: wetness, percs slowly.	Slight-----------	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
38*----------------- Sharkey	Severe: floods, wetness, percs slowly.	Severe: floods.	Severe: floods, wetness, too clayey.	Severe: floods, wetness.	Poor: too clayey, wetness.
39------------------ Tichnor	Severe: floods, percs slowly, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: wetness.
40*. Udorthents					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1, 2 Amagon	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
3, 4 Beulah	Good	Poor: excess fines.	Unsuited: excess fines.	Good.
5*:				
Brandon	Fair: low strength.	Unsuited: excess fines.	Poor: excess fines.	Fair: slope.
Saffell	Good	Poor: excess fines.	Fair: excess fines.	Poor: small stones.
6*:				
Brandon	Fair: slope, low strength.	Unsuited: excess fines.	Poor: excess fines.	Poor: slope.
Saffell	Fair: slope.	Poor: excess fines.	Fair: excess fines.	Poor: slope, small stones.
7 Bruno	Good	Fair: excess fines.	Unsuited: excess fines.	Poor: too sandy.
8 Calhoun	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
9, 10 Calloway	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
11 Collins	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
12, 13* Commerce	Fair: low strength, shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
14 Convent	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
15, 16, 17 Dubbs	Fair: shrink-swell, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer, too clayey.
18, 19 Dundee	Fair: wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
20*:				
Dundee	Fair: wetness, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: thin layer.
Bruno	Good	Fair: excess fines.	Unsuited: excess fines.	Poor: too sandy.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
20*: Cont.				
Commerce	Fair: low strength, shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
21 Falaya	Fair: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
22 Foley	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, area reclaim.
23 Fountain	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
24 Grenada	Fair: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey.
25 Henry	Poor: wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
26 Hillemann	Poor: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Fair: too clayey, area reclaim.
27 Jackport	Poor: wetness, low strength, shrink-swell.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, too clayey.
28 Lafe	Poor: area reclaim, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: area reclaim, excess sodium, thin layer.
29, 30, 31 Loring	Fair: low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Good.
32 Memphis	Poor: slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
33* Memphis	Fair: low strength, slope.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: slope.
34, 35* Mhoon	Poor: wetness, low strength.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
36 Roellen	Poor: shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: too clayey, wetness.
37, 38* Sharkey	Poor: too clayey, shrink-swell, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness, too clayey.
39 Tichnor	Poor: low strength, wetness.	Unsuited: excess fines.	Unsuited: excess fines.	Poor: wetness.
40*. Udorthents				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
1, 2 Amagon	Slight	Moderate: unstable fill, compressible, low strength.	Percs slowly, wetness.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
3, 4 Beulah	Severe: seepage.	Severe: seepage, piping.	Not needed	Complex slope, droughty, fast intake.	Complex slope, too sandy.	Droughty, slope.
5*, 6*:						
Brandon	Moderate: seepage.	Moderate: seepage, piping.	Not needed	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Saffell	Moderate: seepage.	Moderate: seepage, piping, thin layer.	Not needed	Droughty, fast intake, slope.	Erodes easily, slope, small stones.	Droughty, erodes easily, slope.
7 Bruno	Severe: seepage.	Moderate: piping, low strength.	Not needed	Droughty, seepage, slope.	Not needed	Droughty.
8 Calhoun	Slight	Moderate: piping, erodes easily, low strength.	Percs slowly, cutbanks cave.	Wetness, percs slowly.	Not needed	Wetness.
9, 10 Calloway	Slight	Moderate: piping, compressible, low strength.	Cutbanks cave, percs slowly.	Percs slowly, erodes easily.	Percs slowly, erodes easily, piping.	Percs slowly, erodes easily.
11 Collins	Moderate: seepage.	Moderate: piping, unstable fill.	Cutbanks cave, floods.	Erodes easily, floods, wetness.	Not needed	Erodes easily.
12 Commerce	Moderate: seepage.	Slight	Favorable	Favorable	Not needed	Favorable.
13* Commerce	Moderate: seepage.	Slight	Floods	Floods	Not needed	Favorable.
14 Convent	Moderate: seepage.	Moderate: erodes easily, piping, low strength.	Cutbanks cave	Favorable	Not needed	Erodes easily.
15, 16, 17 Dubbs	Moderate: seepage.	Moderate: compressible, piping, unstable fill.	Not needed	Slow intake	Slope, erodes easily.	Favorable.
18, 19 Dundee	Moderate: seepage.	Moderate: seepage, compressible, piping.	Favorable	Wetness, slow intake.	Not needed	Wetness, percs slowly.
20*:						
Dundee	Moderate: seepage.	Moderate: seepage, compressible, piping.	Favorable	Wetness, slow intake.	Not needed	Wetness, percs slowly.
Bruno	Severe: seepage.	Moderate: piping, low strength.	Not needed	Droughty, seepage, slope.	Not needed	Droughty.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
20*: Cont. Commerce	Moderate: seepage.	Slight	Favorable	Favorable	Not needed	Favorable.
21 Falaya	Moderate: seepage.	Moderate: piping.	Floods	Wetness, percs slowly, floods.	Not needed	Wetness, erodes easily, percs slowly.
22 Foley	Slight	Moderate: unstable fill, compressible, low strength.	Wetness, percs slowly.	Wetness, slow intake.	Wetness	Wetness.
23 Fountain	Slight	Slight	Favorable	Wetness	Not needed	Wetness.
24 Grenada	Slight	Moderate: piping, low strength.	Not needed	Slow intake, erodes easily, rooting depth.	Erodes easily, slope.	Erodes easily, slope.
25 Henry	Slight	Moderate: piping.	Percs slowly, poor outlets.	Rooting depth	Not needed	Not needed.
26 Hillemann	Slight	Moderate: piping, compressible, low strength.	Percs slowly, wetness.	Wetness, slow intake.	Wetness	Wetness.
27 Jackport	Slight	Moderate: unstable fill, compressible, low strength.	Wetness, percs slowly.	Slow intake, wetness.	Wetness	Wetness.
28 Lafe	Slight	Moderate: compressible, low strength, piping.	Cutbanks cave, excess sodium, percs slowly.	Droughty, excess sodium, slow intake.	Percs slowly, wetness.	Excess sodium, percs slowly, wetness.
29, 30, 31 Loring	Moderate: seepage.	Moderate: piping, low strength.	Not needed	Rooting depth, erodes easily, slope.	Erodes easily, slope.	Rooting depth, erodes easily, slope.
32, 33* Memphis	Moderate: seepage.	Moderate: piping, compressible, erodes easily.	Not needed	Erodes easily, slope.	Erodes easily, slope, piping.	Erodes easily, slope.
34 Mhoon	Slight	Slight	Percs slowly	Slow intake, wetness, percs slowly.	Not needed	Wetness.
35* Mhoon	Slight	Slight	Percs slowly, floods.	Floods, slow intake, wetness.	Not needed	Wetness.
36 Roellen	Slight	Moderate: compressible.	Percs slowly, poor outlets.	Slow intake, wetness.	Not needed	Not needed.
37 Sharkey	Slight	Moderate: low strength, compressible, shrink-swell.	Complex slope	Percs slowly, slow intake, wetness.	Not needed	Wetness.
38* Sharkey	Slight	Moderate: low strength, compressible, shrink-swell.	Floods, percs slowly.	Floods, percs slowly.	Not needed	Wetness.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
39----------------- Tichnor	Slight----------	Moderate: compressible, low strength, piping.	Floods, percs slowly, wetness.	Slow intake, wetness, floods.	Wetness---------	Wetness.
40*. Udorthents						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
1, 2 Amagon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
3, 4 Beulah	Slight	Slight	Slight	Slight.
5*:				
Brandon	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Saffell	Severe: small stones	Moderate: small stones.	Severe: slope.	Moderate: small stones.
6*:				
Brandon	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Saffell	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
7 Bruno	Slight	Slight	Slight	Slight.
8 Calhoun	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
9, 10 Calloway	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
11 Collins	Severe: floods.	Moderate: floods.	Moderate: floods.	Slight.
12 Commerce	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
13* Commerce	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
14 Convent	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
15 Dubbs	Slight	Slight	Slight	Slight.
16 Dubbs	Slight	Slight	Moderate: slope.	Slight.
17 Dubbs	Slight	Slight	Slight	Slight.
18, 19 Dundee	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
20*:				
Dundee	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Bruno	Slight	Slight	Slight	Slight.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
20*: Cont.				
Commerce	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
21 Falaya	Severe: floods, wetness.	Moderate: floods, wetness.	Severe: floods, wetness.	Moderate: floods, wetness.
22 Foley	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
23 Fountain	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
24 Grenada	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly, wetness.	Slight.
25 Henry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
26 Hillemann	Severe: percs slowly.	Moderate: wetness.	Severe: percs slowly.	Moderate: wetness.
27 Jackport	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey.	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey.
28 Lafe	Severe: dusty, percs slowly, wetness.	Moderate: dusty, wetness.	Severe: dusty, percs slowly, wetness.	Moderate: dusty, wetness.
29, 30 Loring	Slight	Slight	Moderate: slope.	Slight.
31 Loring	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
32 Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
33* Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
34 Mhoon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
35* Mhoon	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
36 Roellen	Severe: wetness, too clayey.	Severe: wetness, too clayey.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
37 Sharkey	Severe: too clayey, percs slowly, wetness.	Severe: too clayey, wetness.	Severe: too clayey, percs slowly, wetness.	Severe: too clayey, wetness.
38* Sharkey	Severe: floods, too clayey, percs slowly.	Severe: floods, too clayey, wetness.	Severe: floods, too clayey, percs slowly.	Severe: floods, too clayey, wetness.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
39-------------------- Tichnor	Severe: wetness.	Severe: wetness.	Severe: floods, wetness.	Severe: wetness.
40*. Udorthents				

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1, 2 Amagon	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3, 4 Beulah	Fair	Fair	Fair	Good	Poor	Very poor.	Very poor.	Fair	Good	Very poor.
5*:										
Brandon	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Saffell	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
6*:										
Brandon	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Saffell	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
7 Bruno	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
8 Calhoun	Poor	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
9 Calloway	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
10 Calloway	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
11 Collins	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
12 Commerce	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
13* Commerce	Poor	Fair	Fair	Good	---	Fair	Fair	Fair	Good	Fair.
14 Convent	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
15, 16, 17 Dubbs	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
18, 19 Dundee	Fair	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
20* Dundee.	Fair	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
Bruno	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Commerce	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
21 Falaya	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.

See footnote at end of table.

TABLE 14.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
22----------------- Foley	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
23----------------- Fountain	Fair	Fair	Fair	Good	Fair	Good	Good	Fair	Good	Good.
24----------------- Grenada	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
25----------------- Henry	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
26----------------- Hillemann	Fair	Good	Good	Good	Good	Good	Good	Good	Good	Good.
27----------------- Jackport	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
28----------------- Lafe	Very poor.	Very poor.	Poor	Poor	Poor	Poor	Good	Very poor.	Poor	Fair.
29----------------- Loring	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
30, 31------------- Loring	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
32----------------- Memphis	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
33*---------------- Memphis	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
34----------------- Mhoon	Fair	Fair	Fair	Good	---	Good	Good	Fair	Good	Good.
35*---------------- Mhoon	Poor	Fair	Fair	Fair	---	Good	Good	Poor	Good	Good.
36----------------- Roellen	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
37----------------- Sharkey	Fair	Fair	Fair	Good	---	Good	Good	Fair	Good	Good.
38*---------------- Sharkey	Poor	Fair	Fair	Good	---	Fair	Fair	Poor	Fair	Fair.
39----------------- Tichnor	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
40* Udorthents										

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1------------------- Amagon	0-8	Fine sandy loam	ML, SM	A-4	0	---	100	80-95	40-65	<20	NP-3
	8-17	Silt loam-------	CL, CL-ML	A-4, A-6	0	---	100	85-100	85-100	25-40	7-18
	17-48	Silt loam, silty clay loam.	CL	A-6, A-7	0	---	100	85-100	85-100	30-45	11-22
	48-72	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	---	100	80-100	60-100	20-45	1-22
2------------------- Amagon	0-8	Silt loam-------	ML, CL, CL-ML	A-4	0	---	100	85-100	85-100	<30	NP-10
	8-17	Silt loam-------	CL, CL-ML	A-4, A-6	0	---	100	85-100	85-100	25-40	7-18
	17-48	Silt loam, silty clay loam.	CL	A-6, A-7	0	---	100	85-100	85-100	30-45	11-22
	48-72	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	---	100	80-100	60-100	20-45	1-22
3, 4---------------- Beulah	0-8	Fine sandy loam	SM	A-2, A-4	0	100	100	75-100	25-45	---	NP
	8-50	Fine sandy loam, very fine sandy loam, loam.	SM, ML	A-2, A-4	0	100	100	85-100	25-60	---	NP
	50-72	Loamy sand, sand, loamy fine sand.	SM	A-2, A-4	0	100	100	65-100	15-45	---	NP
5*, 6*: Brandon------------	0-5	Silt loam-------	ML, CL, CL-ML	A-4	0	100	95-100	90-100	85-100	<30	NP-10
	5-39	Silty clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-100	25-40	3-15
	39-72	Very gravelly fine sandy loam, very gravelly silt loam, gravelly clay loam.	GM, GC, GM-GC, SM-SC	A-2, A-4, A-1	0-5	30-70	20-60	15-55	10-50	<30	NP-10
Saffell------------	0-3	Gravelly silt loam.	SM	A-1, A-2, A-4	0-5	70-80	50-75	40-65	20-40	<20	NP-3
	3-15	Gravelly silt loam, gravelly sandy clay loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	0-15	35-85	25-70	20-55	15-35	20-40	4-18
	15-58	Very gravelly sandy clay loam, very gravelly fine sandy loam, very gravelly loam.	GC, SC, SM-SC, GM-GC	A-2, A-1	0-15	35-85	25-70	20-55	15-35	20-40	4-18
	58-72	Gravelly sandy loam, very gravelly sandy loam, gravelly loamy sand.	GM, GC, SM, SC	A-1, A-2, A-3	0-5	25-80	10-70	5-60	5-35	<35	NP-15
7------------------- Bruno	0-10	Loamy sand-------	SM, ML	A-2, A-4	0	100	100	60-85	30-60	<25	NP-3
	10-45	Sand, loamy sand	SP-SM, SM	A-2	0	100	100	60-80	10-30	---	NP
	45-72	Silt loam, fine sandy loam.	SM-SC, SM, CL-ML, ML	A-4	0	100	100	70-85	40-55	<25	NP-5

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
8----------------- Calhoun	0-23	Silt loam-------	CL-ML, ML, CL	A-4	0	100	100	100	95-100	<31	NP-10
	23-53	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	95-100	30-45	11-24
	53-72	Silt loam-------	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
9, 10------------- Calloway	0-28	Silt loam-------	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
	28-66	Silt loam, silty clay loam.	CL	A-6	0	100	100	100	90-95	30-40	12-20
	66-72	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	100	90-100	25-35	5-15
11---------------- Collins	0-7	Silt loam-------	ML, CL, CL-ML	A-4	0	100	100	85-100	70-90	<30	NP-8
	7-72	Silt loam, silt	ML, CL-ML	A-4	0	100	100	100	90-100	<35	NP-10
12, 13*----------- Commerce	0-8	Very fine sandy loam.	CL-ML, CL, ML	A-4	0	100	100	100	75-100	<30	NP-10
	8-40	Silty clay loam, silt loam, loam.	CL	A-6, A-7	0	100	100	100	85-100	32-45	11-23
	40-72	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7	0	100	100	100	75-100	23-45	3-23
14---------------- Convent	0-11	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	0	100	100	75-90	40-60	<27	NP-7
	11-76	Silt loam, very fine sandy loam.	ML, CL-ML	A-4	0	100	100	95-100	75-100	<27	NP-7
15, 16------------ Dubbs	0-12	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0	100	100	70-85	40-55	<25	NP-5
	12-41	Silty clay loam, clay loam, sandy clay loam.	CL	A-6, A-7	0	100	100	100	85-100	35-50	15-25
	41-72	Loam, silt loam, loamy sand.	SC, SC-SM, CL-ML, CL	A-4, A-6, A-2	0	100	100	65-95	30-90	>35	5-14
17---------------- Dubbs	0-12	Silt loam-------	CL-ML, CL	A-4	0	100	100	100	85-100	20-30	5-10
	12-41	Silty clay loam, clay loam, sandy clay loam.	CL	A-6, A-7	0	100	100	100	85-100	35-50	15-25
	41-72	Loam, silt loam, loamy sand.	SC, SC-SM, CL-ML, CL	A-4, A-6, A-2	0	100	100	65-95	30-90	>35	5-14
18---------------- Dundee	0-7	Fine sandy loam	ML, CL-ML	A-4	0	100	100	75-95	51-75	<30	NP-7
	7-45	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	45-72	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
19 Dundee	0-7	Silt loam	CL, CL-ML, ML	A-4, A-6	0	100	100	90-100	75-98	20-35	4-11
	7-45	Loam, silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	45-72	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
20*: Dundee	0-7	Fine sandy loam	ML, CL-ML	A-4	0	100	100	75-95	51-75	<30	NP-7
	7-45	Loam, silty clay loam, clay loam.	CL	A-6, A-7	0	100	100	90-100	70-95	28-44	12-22
	45-72	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	0	100	100	85-100	60-90	<30	NP-8
Bruno	0-10	Loamy sand	SM, ML	A-2, A-4	0	100	100	60-85	30-60	<25	NP-3
	10-45	Sand, loamy sand	SP-SM, SM	A-2	0	100	100	60-80	10-30	---	NP
	45-72	Sand	SP-SM, SM	A-2, A-3	0	100	100	50-70	5-20	---	NP
Commerce	0-8	Very fine sandy loam.	CL-ML, CL, ML	A-4	0	100	100	100	75-100	<30	NP-10
	8-40	Silty clay loam, silt loam, loam.	CL	A-6, A-7	0	100	100	100	85-100	32-45	11-23
	40-72	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7	0	100	100	100	75-100	23-45	3-23
21 Falaya	0-48	Silt loam, silt	ML, CL-ML, CL	A-4	0	100	100	100	95-100	<30	NP-10
	48-72	Silt loam, silty clay loam.	ML, CL	A-4, A-6, A-7	0	100	100	100	95-100	25-43	7-16
22 Foley	0-12	Silt loam	CL, CL-ML	A-4, A-6, A-7	0	100	100	95-100	70-100	25-45	5-20
	12-20	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-49	11-25
	20-61	Silty clay loam, silt loam.	CL, CH	A-6, A-7	0	100	100	95-100	90-100	40-60	18-32
	61-72	Silt loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-45	11-20
23 Fountain	0-15	Silt loam	CL-ML, ML	A-4	0	100	100	100	95-100	<27	NP-7
	15-60	Silty clay loam, silt loam.	CL	A-6	0	95-100	90-100	90-100	80-100	32-40	11-18
	60-72	Silt loam	CL-ML, CL	A-4, A-6	0	95-100	90-100	90-100	80-100	25-36	5-14
24 Grenada	0-5	Silt loam	ML, CL-ML	A-4	0	100	100	100	90-100	<30	NP-6
	5-18	Silt loam, silty clay loam.	CL	A-6, A-4	0	100	100	100	90-100	27-40	8-19
	18-62	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	32-45	13-24
	62-72	Silt loam, loam	CL	A-6, A-7	0	100	100	100	90-100	32-45	13-24

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
25----------------- Henry	0-14	Silt loam-------	ML, CL-ML, CL	A-4	0	100	100	95-100	90-100	<34	NP-9
	14-32	Silt loam-------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	26-40	3-15
	32-72	Silty clay loam, silt loam.	ML, CL	A-4, A-6, A-7	0	100	100	95-100	90-100	30-42	9-16
	72-84	Silt, silt loam	ML, CL-ML, CL	A-4	0	100	100	95-100	90-100	25-32	3-10
26----------------- Hillemann	0-8	Silt loam-------	ML, CL, CL-ML	A-4	0	100	100	90-100	85-100	<30	NP-10
	8-16	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	90-100	20-30	5-11
	16-40	Silty clay loam, silty clay.	CL, CH	A-6, A-7	0	100	100	90-100	90-100	35-55	15-30
	40-72	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	100	90-100	90-100	25-45	5-25
27----------------- Jackport	0-12	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	85-100	30-55	12-30
	12-23	Silty clay, clay	CH	A-7	0	100	100	95-100	90-100	51-85	25-55
	23-61	Clay, silty clay, silty clay loam.	CH	A-7	0	100	100	95-100	90-100	51-85	25-55
	61-72	Silty clay, silty clay loam, silt loam.	CH, CL	A-7	0	100	100	95-100	90-100	45-75	20-45
28----------------- Lafe	0-10	Silt loam-------	ML, CL-ML, CL	A-4	0	100	100	95-100	90-100	<30	NP-10
	10-50	Silt loam, silty clay loam.	CL	A-4, A-6, A-7	0	100	100	95-100	90-100	25-45	8-25
	50-72	Silt loam, silty clay loam, silty clay.	ML, CL, SM, CH	A-4, A-6, A-7	0	100	100	90-100	45-100	20-65	1-35
29, 30, 31--------- Loring	0-2	Silt loam-------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	20-35	4-15
	2-28	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	90-100	35-45	15-25
	28-72	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-18
32, 33*------------ Memphis	0-10	Silt loam-------	ML, CL-ML, CL	A-4	0	100	100	100	90-100	<30	NP-10
	10-72	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	90-100	35-48	15-25
34----------------- Mhoon	0-8	Fine sandy loam	SM, ML, CL-ML, SM-SC	A-4	0	100	100	75-95	40-75	<30	NP-7
	8-72	Silty clay loam, silt loam, clay loam.	CL, CH	A-6, A-7	0	100	100	100	95-100	30-55	11-28

See footnote at end of table.

TABLE 15.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
35*: Mhoon	0-8	Silt loam	ML, CL-ML, CL	A-4	0	100	100	100	95-100	22-30	3-10
	8-72	Silty clay loam, silt loam, clay loam.	CL, CH	A-6, A-7	0	100	100	100	95-100	30-55	11-28
36: Roellen	0-4	Silty clay loam	CL, CH	A-6, A-7	0	100	100	95-100	90-100	45-65	20-40
	4-44	Clay, silty clay	CH	A-7	0	100	100	95-100	90-100	55-80	30-50
	44-72	Clay, silty clay, silty clay loam.	CH, CL, CL-ML	A-7, A-6, A-4	0	100	95-100	80-100	60-95	15-80	6-50
37, 38*: Sharkey	0-5	Clay	CH, CL	A-7	0	100	100	100	95-100	46-85	22-50
	5-49	Clay	CH	A-7	0	100	100	100	95-100	56-85	30-50
	49-80	Clay, silty clay loam, silt loam.	CL-ML, CL, CH	A-4, A-6, A-7	0	100	100	100	95-100	25-85	5-50
39: Tichnor	0-32	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	<35	NP-15
	32-72	Silty clay loam, silt loam.	CL	A-4, A-6	0	100	100	95-100	90-100	30-45	10-25
40*. Udorthents											

* See description of the map unit for composition and behavior characteristcs of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means greater then. Entries under erosion factors--(T) apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
1------------------ Amagon	0-8	0.6-2.0	0.10-0.15	4.5-6.0	Low--------	High-----------	High-----------	0.32	5
	8-17	0.2-0.6	0.16-0.24	4.5-6.0	Low--------	High-----------	High-----------	0.43	
	17-48	0.06-0.2	0.16-0.24	4.5-6.0	Moderate	High-----------	High-----------	0.37	
	48-72	0.06-0.6	0.15-0.24	5.1-7.8	Low--------	High-----------	High-----------	0.43	
2------------------ Amagon	0-8	0.6-2.0	0.16-0.24	4.5-6.0	Low--------	High-----------	High-----------	0.43	5
	8-17	0.2-0.6	0.16-0.24	4.5-6.0	Low--------	High-----------	High-----------	0.43	
	17-48	0.06-0.2	0.16-0.24	4.5-6.0	Moderate	High-----------	High-----------	0.37	
	48-72	0.06-0.6	0.15-0.24	5.1-7.8	Low--------	High-----------	High-----------	0.43	
3, 4--------------- Beulah	0-8	2.0-6.0	0.10-0.15	4.5-6.0	Low--------	Low------------	Moderate--------	0.20	5
	8-50	2.0-6.0	0.10-0.20	4.5-6.0	Low--------	Low------------	Moderate--------	0.20	
	50-72	>6.0	0.02-0.15	5.1-7.3	Low--------	Low------------	Moderate--------	0.17	
5*, 6*:									
Brandon------------	0-5	0.6-2.0	0.18-0.23	4.5-5.5	Low--------	Moderate-------	High-----------	0.37	3
	5-39	0.6-2.0	0.18-0.23	4.5-5.5	Low--------	Moderate-------	High-----------	0.28	
	39-72	2.0-20.0	0.05-0.12	4.5-5.5	Low--------	Low------------	High-----------	0.17	
Saffell------------	0-3	2.0-6.0	0.05-0.10	4.5-5.5	Low--------	Low------------	Moderate--------	0.20	4
	3-15	0.6-2.0	0.06-0.10	4.5-5.5	Low--------	Low------------	Moderate--------	0.28	
	15-58	0.6-2.0	0.06-0.12	4.5-5.5	Low--------	Low------------	Moderate--------	0.28	
	58-72	0.6-6.0	0.04-0.11	4.5-5.5	Low--------	Low------------	Moderate--------	0.17	
7------------------ Bruno	0-10	6.0-20.0	0.10-0.15	5.1-7.8	Low--------	Low------------	Low------------	0.17	5
	10-45	6.0-20.0	0.05-0.10	5.1-7.8	Low--------	Low------------	Low------------	0.17	
	45-72	6.0-20.0	0.02-0.05	5.1-7.8	Very low	Low------------	Low------------	0.17	
8------------------ Calhoun	0-23	0.2-0.6	0.21-0.23	4.5-6.0	Low--------	High-----------	Moderate--------	0.49	3
	23-53	0.06-0.2	0.20-0.22	4.5-7.3	Low--------	High-----------	Moderate--------	0.43	
	53-72	0.2-0.6	0.21-0.23	4.5-7.8	Low--------	High-----------	Moderate--------	0.43	
9, 10-------------- Calloway	0-28	0.6-2.0	0.20-0.23	4.5-6.0	Low--------	High-----------	Moderate--------	0.49	3
	28-66	0.06-0.2	0.09-0.12	4.5-6.0	Moderate	High-----------	Moderate--------	0.49	
	66-72	0.06-0.2	0.09-0.12	5.1-7.8	Low--------	High-----------	Moderate--------	0.49	
11----------------- Collins	0-7	0.6-2.0	0.16-0.24	4.5-5.5	Low--------	Moderate-------	Moderate--------	0.43	5
	7-72	0.6-2.0	0.20-0.24	4.5-5.5	Low--------	Moderate-------	Moderate--------	0.43	
12, 13*------------ Commerce	0-8	0.6-2.0	0.21-0.23	5.6-7.8	Low--------	High-----------	Low------------	0.37	5
	8-40	0.2-0.6	0.20-0.22	6.1-8.4	Moderate	High-----------	Low------------	0.32	
	40-72	0.2-2.0	0.20-0.23	6.6-8.4	Low--------	High-----------	Low------------	0.37	
14----------------- Convent	0-11	0.6-2.0	0.18-0.23	5.6-8.4	Low--------	High-----------	Low------------	0.37	5
	11-76	0.6-2.0	0.20-0.23	6.1-8.4	Low--------	High-----------	Low------------	0.37	
15, 16------------- Dubbs	0-12	0.6-2.0	0.11-0.14	4.5-6.0	Low--------	Moderate-------	Moderate--------	0.24	5
	12-41	0.6-2.0	0.18-0.22	4.5-6.0	Moderate	Moderate-------	Moderate--------	0.37	
	41-72	2.0-6.0	0.20-0.22	4.5-6.0	Low--------	Moderate-------	Moderate--------	0.37	
17----------------- Dubbs	0-12	0.6-2.0	0.20-0.22	4.5-6.0	Low--------	Moderate-------	Moderate--------	0.37	5
	12-41	0.6-2.0	0.18-0.22	4.5-6.0	Moderate	Moderate-------	Moderate--------	0.37	
	41-72	2.0-6.0	0.20-0.22	4.5-6.0	Low--------	Moderate-------	Moderate--------	0.37	
18----------------- Dundee	0-7	0.6-2.0	0.15-0.20	4.5-6.0	Low--------	High-----------	Moderate--------	0.37	4
	7-45	0.2-0.6	0.15-0.20	4.5-6.0	Moderate	High-----------	Moderate--------	0.37	
	45-72	0.6-2.0	0.15-0.20	4.5-7.3	Low--------	High-----------	Moderate--------	0.37	
19----------------- Dundee	0-7	0.6-2.0	0.15-0.20	4.5-6.0	Low--------	High-----------	Moderate--------	0.37	4
	7-45	0.2-0.6	0.15-0.20	4.5-6.0	Moderate	High-----------	Moderate--------	0.37	
	45-72	0.6-2.0	0.15-0.20	4.5-7.3	Low--------	High-----------	Moderate--------	0.37	

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
20*:									
Dundee	0-7	0.6-2.0	0.15-0.20	4.5-6.0	Low	High	Moderate	0.37	4
	7-45	0.2-0.6	0.15-0.20	4.5-6.0	Moderate	High	Moderate	0.32	
	45-72	0.6-2.0	0.15-0.20	4.5-7.3	Low	High	Moderate	0.32	
Bruno	0-10	6.0-20.0	0.10-0.15	5.1-7.8	Low	Low	Low	0.17	5
	10-45	6.0-20.0	0.05-0.10	5.1-7.8	Low	Low	Low	0.17	
	45-72	6.0-20.0	0.02-0.05	5.1-7.8	Very low	Low	Low	0.17	
Commerce	0-8	0.6-2.0	0.21-0.23	5.6-7.8	Low	High	Low	0.37	5
	8-40	0.2-0.6	0.20-0.22	6.1-8.4	Moderate	High	Low	0.32	
	40-72	0.2-2.0	0.20-0.23	6.6-8.4	Low	High	Low	0.37	
21 Falaya	0-48	0.6-2.0	0.20-0.22	4.5-5.5	Low	High	Moderate	0.43	5
	48-72	0.06-2.0	0.14-0.22	4.5-5.5	Low	High	Moderate	0.43	
22 Foley	0-12	0.6-2.0	0.13-0.24	4.5-7.3	Low	High	Low	0.43	3
	12-20	0.2-0.6	0.18-0.24	5.1-7.3	Moderate	High	Low	0.43	
	20-61	<0.06	0.10-0.14	5.1-9.0	Moderate	High	Low	0.43	
	61-72	<0.06	0.10-0.14	6.6-9.0	Low	High	Low	0.49	
23 Fountain	0-15	0.2-0.6	0.20-0.23	5.6-7.8	Low	High	Low	0.37	3
	15-60	0.2-0.6	0.20-0.22	6.6-7.8	Moderate	High	Low	0.37	
	60-72	0.2-0.6	0.21-0.23	6.6-8.4	Low	High	Low	0.37	
24 Grenada	0-5	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.43	3
	5-18	0.6-2.0	0.20-0.23	4.5-6.0	Low	Moderate	Moderate	0.43	
	18-62	0.06-0.2	0.10-0.12	4.5-6.0	Low	Moderate	Moderate	0.37	
	62-72	0.06-0.2	0.10-0.12	5.1-7.3	Low	Moderate	Moderate	0.37	
25 Henry	0-14	0.6-2.0	0.20-0.23	4.5-5.5	Low	High	Moderate	0.43	---
	14-32	0.6-2.0	0.20-0.23	4.5-5.5	Low	High	Moderate	0.43	
	32-72	0.06-0.2	0.14-0.17	4.5-6.0	Low	High	Moderate	0.43	
	72-84	0.2-0.6	0.20-0.23	5.6-7.8	Low	High	Moderate	0.49	
26 Hillemann	0-8	0.2-0.6	0.22-0.30	5.1-6.0	Low	High	Moderate	0.49	3
	8-16	0.2-0.6	0.18-0.24	5.1-6.0	Low	High	Moderate	0.49	
	16-40	<0.06	0.14-0.22	5.1-6.5	Moderate	High	Moderate	0.43	
	40-72	<0.06	0.10-0.14	5.6-7.3	Low	High	Moderate	0.49	
27 Jackport	0-12	0.2-0.6	0.18-0.22	4.5-6.0	Moderate	High	High	0.43	5
	12-23	<0.06	0.12-0.18	4.5-5.5	High	High	High	0.32	
	23-61	<0.06	0.12-0.18	4.5-7.8	High	High	High	0.32	
	61-72	<0.2	0.14-0.24	6.1-7.8	High	High	Low	0.43	
28 Lafe	0-10	0.6-2.0	0.13-0.24	5.1-7.3	Low	High	Moderate	0.49	1
	10-50	<0.06	0.09-0.15	7.4-9.0	Moderate	High	Low	0.49	
	50-72	<0.2	0.02-0.07	7.9-9.0	Moderate	High	Low	0.49	
29, 30, 31 Loring	0-2	0.6-2.0	0.20-0.23	5.1-6.0	Low	Moderate	Moderate	0.43	3
	2-28	0.6-2.0	0.20-0.22	5.1-6.0	Low	Moderate	Moderate	0.43	
	28-72	0.2-0.6	0.06-0.13	5.1-6.0	Low	Moderate	Moderate	0.43	
32, 33* Memphis	0-10	0.6-2.0	0.20-0.23	4.5-6.0	Low	Low	Moderate	0.37	5
	10-72	0.6-2.0	0.20-0.22	4.5-6.0	Low	Moderate	Moderate	0.37	
34 Mhoon	0-8	0.6-2.0	0.12-0.15	6.1-7.8	Low	High	Low	0.37	5
	8-72	0.06-0.2	0.18-0.22	6.1-8.4	Moderate	High	Low	0.37	
35* Mhoon	0-8	0.6-2.0	0.21-0.23	6.1-7.8	Low	High	Low	0.43	5
	8-72	0.06-0.2	0.18-0.22	6.1-8.4	Moderate	High	Low	0.37	
36 Roellen	0-4	0.06-0.2	0.15-0.19	5.6-7.8	High	High	Low	0.32	5
	4-44	0.06-0.2	0.14-0.17	5.6-7.8	High	High	Low	0.37	
	44-72	0.06-2.0	0.14-0.20	5.6-7.8	High	High	Low	0.37	

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
37, 38*------------ Sharkey	0-5	<0.06	0.18-0.20	5.1-8.4	Very high	High----------	Low-------------	0.24	5
	5-49	<0.06	0.18-0.20	5.6-8.4	Very high	High----------	Low-------------	0.28	
	49-80	0.06-0.2	0.18-0.22	6.6-8.4	Very high	High----------	Low-------------	0.28	
39----------------- Tichnor	0-32	0.6-2.0	0.16-0.24	4.5-6.0	Low--------	High----------	Moderate--------	0.43	5
	32-72	0.06-0.2	0.16-0.24	4.5-6.0	Moderate	High----------	Moderate--------	0.37	
40*. Udorthents									

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

[The definitions "flooding" and "water table" in the Glossary explain terms such as "rare," "brief," "apparent," and "perched." The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness
					Ft			In	
1, 2: Amagon	D	None to occasional.	Very brief to brief.	Dec-Apr	1.0-2.0	Perched	Dec-Apr	>60	---
3, 4: Beulah	B	None to rare	Brief to long.	Dec-Apr	>6.0	---	---	>60	---
5*, 6*:									
Brandon	B	None	---	---	>6.0	---	---	>60	---
Saffell	B	None	---	---	>6.0	---	---	>60	---
7: Bruno	A	None to common.	Brief	Dec-Jun	4.0-6.0	Apparent	Dec-Apr	>60	---
8: Calhoun	D	None	---	---	0-2.0	Apparent	Dec-Apr	>60	---
9, 10: Calloway	C	None	---	---	1.0-2.0	Perched	Jan-Apr	>60	---
11: Collins	C	Rare to common.	Brief to very long.	Jan-Apr	2.0-5.0	Apparent	Jan-Apr	>60	---
12, 13*: Commerce	C	None to common.	Brief to long.	Dec-Jun	1.5-4.0	Apparent	Dec-Apr	>60	---
14: Convent	C	None to common.	Brief to long.	Dec-Jul	1.5-4.0	Apparent	Dec-Apr	>60	---
15, 16, 17: Dubbs	B	None	---	---	>6.0	---	---	>60	---
18, 19: Dundee	C	None	---	---	1.5-3.5	Apparent	Jan-Apr	>60	---
20*:									
Dundee	C	None	---	---	1.5-3.5	Apparent	Jan-Apr	>60	---
Bruno	A	None to common.	Brief	Dec-Jun	4.0-6.0	Apparent	Dec-Apr	>60	---
Commerce	C	None to common.	Brief to long.	Dec-Jun	1.5-4.0	Apparent	Dec-Apr	>60	---
21: Falaya	D	Common	Brief to long.	Dec-Apr	1.0-2.0	Apparent	Dec-Apr	>60	---
22: Foley	D	None to occasional.	Brief to long.	Dec-May	0-1.0	Perched	Dec-Apr	>60	---
23: Fountain	D	None	---	---	0.0-1.5	Apparent	Dec-Apr	>60	---
24: Grenada	C	None	---	---	2.0-2.5	Perched	Jan-Mar	>60	---
25: Henry	D	None to rare	---	---	1.0-1.5	Perched	Dec-Apr	>60	---
26: Hillemann	C	None	---	---	0.5-1.0	Perched	Dec-Apr	>60	---

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

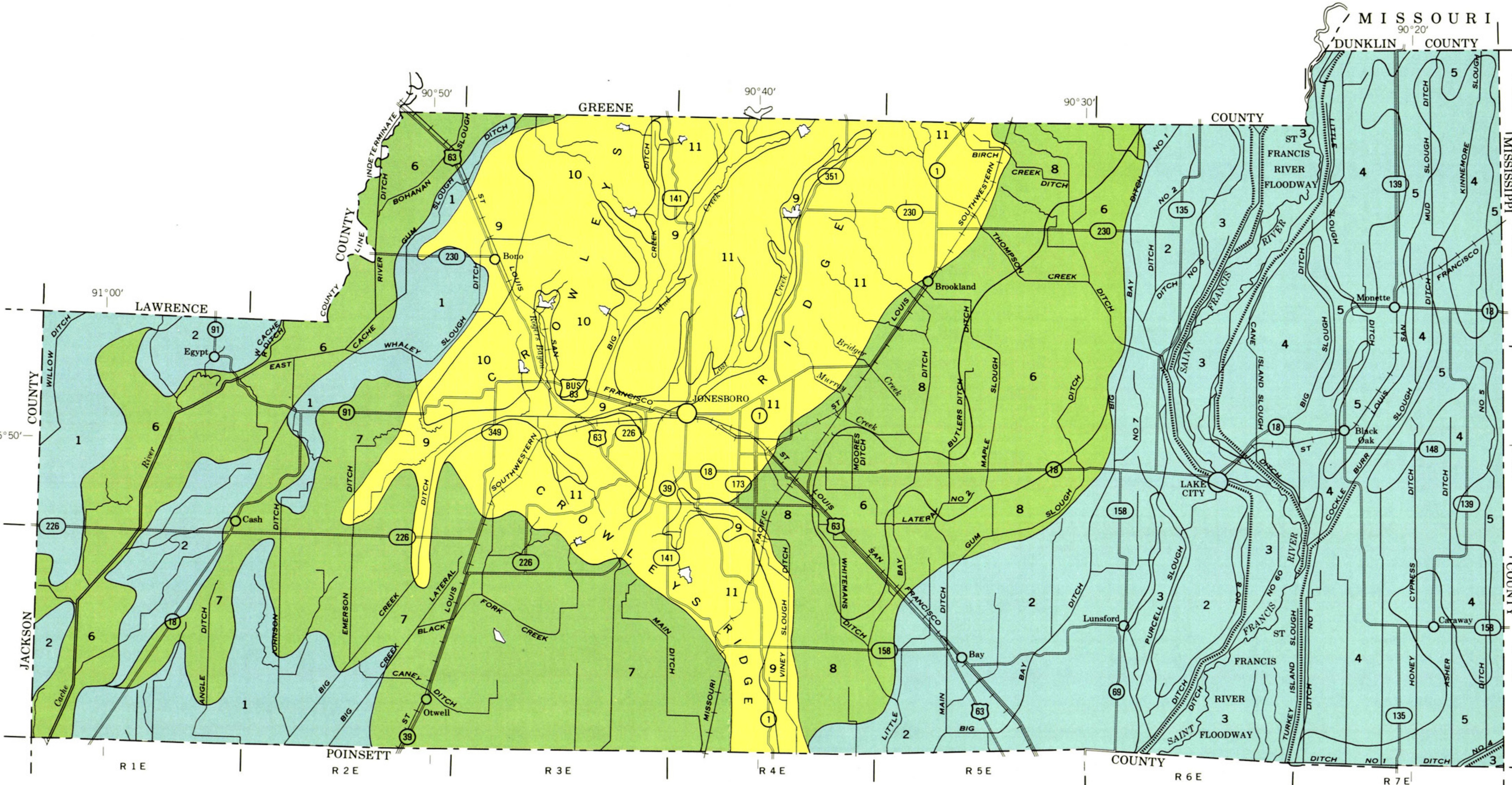
Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness
					Ft			In	
27. Jackport	D	None	---	---	0-1.0	Perched	Dec-Apr	>60	---
28. Lafe	D	None	---	---	0-1.0	Perched	Dec-Apr	>60	---
29, 30, 31. Loring	C	None	---	---	2.0-3.0	Perched	Dec-Mar	>60	---
32, 33*. Memphis	B	None	---	---	>6.0	---	---	>60	---
34. Mhoon	D	None	---	---	0-3.0	Apparent	Dec-Apr	>60	---
35*. Mhoon	D	Frequent	Long to very long	Jan-Jun	0-3.0	Apparent	Dec-Apr	>60	---
36. Roellen	D	Occasional	Long	Jan-Jun	0-1.0	Apparent	Jan-May	>60	---
37. Sharkey	D	None	---	---	0-2.0	Apparent	Dec-Apr	>60	---
38*. Sharkey	D	Frequent	Brief to very long.	Dec-Jun	0-2.0	Apparent	Dec-Apr	>60	---
39. Tichnor	D	Occasional	Long to very long.	Jan-Jun	0-1.0	Perched	Dec-May	>60	---
40*. Udorthents									

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Amagon	Fine-silty, mixed, thermic Typic Ochraqualfs
Beulah	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Brandon	Fine-silty, mixed, thermic Typic Hapludults
Bruno	Sandy, mixed, thermic Typic Udifluvents
Calhoun	Fine-silty, mixed, thermic Typic Glossaqualfs
Calloway	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
Collins	Coarse-silty, mixed, acid, thermic Aquic Udifluvents
Commerce	Fine-silty, mixed, nonacid, thermic Aeric Fluvaquents
Convent	Coarse-silty, mixed, nonacid, thermic Aeric Fluvaquents
Dubbs	Fine-silty, mixed, thermic Typic Hapludalfs
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
Falaya	Coarse-silty, mixed, acid, thermic Aeric Fluvaquents
Foley	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Fountain	Fine-silty, mixed, thermic Typic Glossaqualfs
Grenada	Fine-silty, mixed, thermic Glossic Fragiudalfs
Henry	Coarse-silty, mixed, thermic Typic Fragiaqualfs
Hillemann	Fine-silty, mixed, thermic Albic Glossic Natraqualfs
Jackport	Very-fine, montmorillonitic, thermic Vertic Ochraqualfs
Lafe	Fine-silty, mixed, thermic Glossic Natrudalfs
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
Memphis	Fine-silty, mixed, thermic Typic Hapludalfs
Mhoon	Fine-silty, mixed, nonacid, thermic Typic Fluvaquents
Roellen	Fine, montmorillonitic, thermic Vertic Haplaquolls
Saffell	Loamy-skeletal, siliceous, thermic Typic Hapludults
Sharkey	Very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Tichnor	Fine-silty, mixed, thermic Typic Ochraqualfs

NRCS Accessibility Statement



LEGEND

SOILS FORMED IN ALLUVIAL SEDIMENTS ON FLOOD PLAINS, NATURAL LEVEES, TERRACES, AND SLACK WATER AREAS

1 JACKPORT: Poorly drained, level, loamy soils in broad slack water areas

2 DUNDEE-DUBBS-AMAGON: Well drained to poorly drained, gently undulating to level, loamy soils on natural levees and broad flats

3 SHARKEY: Poorly drained, level, clayey soils on flood plains and broad slack water flats

4 COMMERCE-MHOON: Somewhat poorly drained and poorly drained, level to slightly depressional, loamy soils on flood plains

5 AMAGON-DUNDEE: Poorly drained and somewhat poorly drained, level, loamy soils in depressional parts of low terraces and on higher parts of terraces and natural levees

SOILS FORMED IN WIND-LAID AND ALLUVIAL SEDIMENTS ON UPLANDS

6 FOLEY: Poorly drained, level, loamy soils on broad flats on loess plains

7 HILLEMANN-HENRY: Somewhat poorly drained and poorly drained, level, loamy soils on broad flats on loess plains

8 FOUNTAIN-CALHOUN-FOLEY: Poorly drained, level, loamy soils on broad flats

SOILS FORMED IN WIND-LAID SEDIMENTS AND COASTAL PLAIN SEDIMENTS ON UPLANDS

9 COLLINS-FALAYA: Moderately well drained and somewhat poorly drained, level, loamy soils on flood plains

10 BRANDON-SAFFELL: Well drained, moderately sloping to moderately steep, loamy and gravelly soils on uplands

11 LORING-MEMPHIS: Moderately well drained and well drained, nearly level to steep, loamy soils on uplands

Compiled 1978

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ARKANSAS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

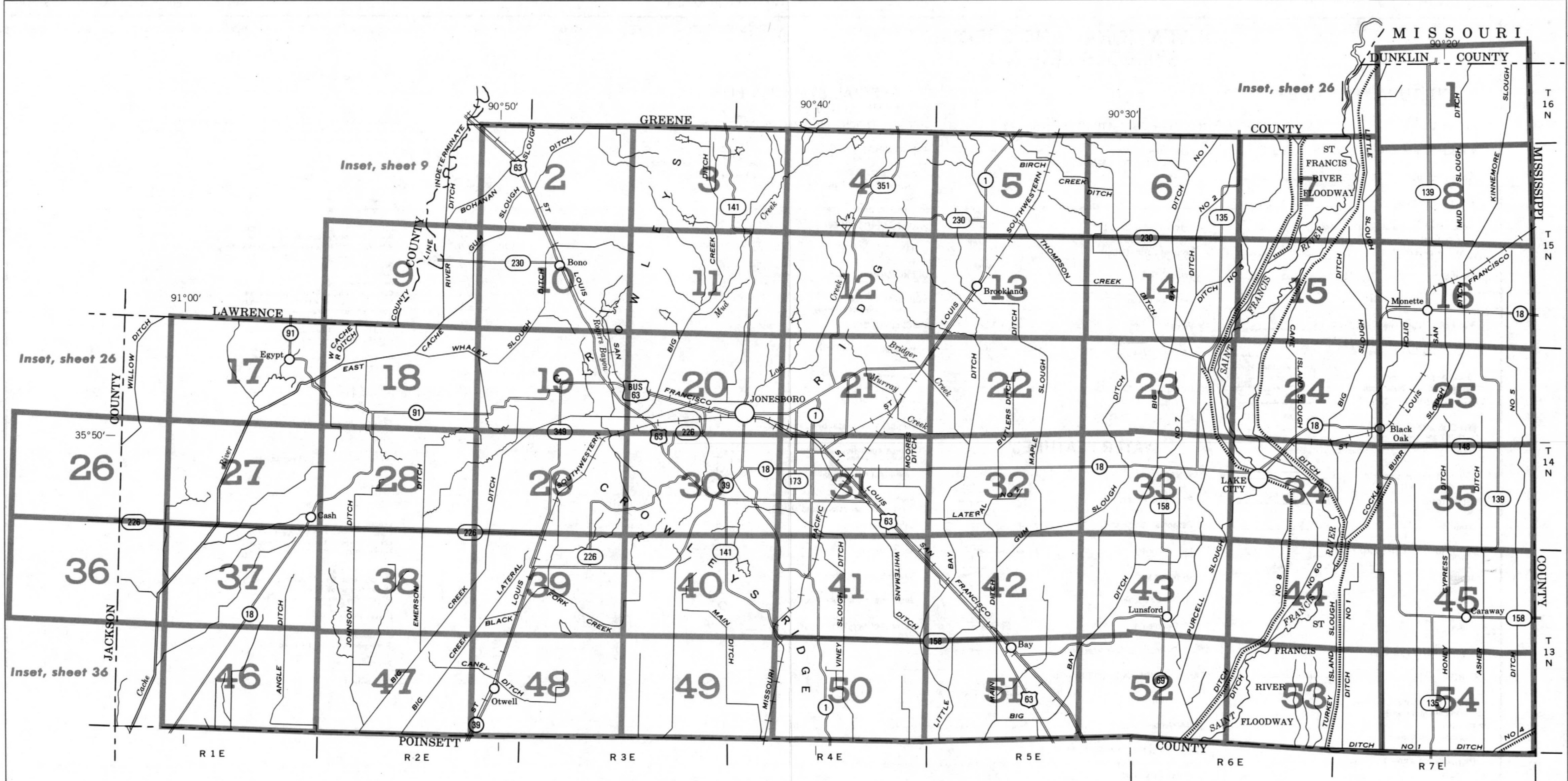
CRAIGHEAD COUNTY, ARKANSAS

N

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



INDEX TO MAP SHEETS

CRAIGHEAD COUNTY, ARKANSAS

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water; w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

CeA FoB2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

S

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

SOIL LEGEND

The legend is numeric. Soil names followed by the superscript 1/ are broadly defined units. The composition of these units is more variable than that of the other units in the survey area, but has been controlled well enough to be interpreted for the expected use of the soils.

SYMBOL	NAME
1	Amagon fine sandy loam
2	Amagon silt loam
3	Beulah fine sandy loam, 0 to 1 percent slopes
4	Beulah fine sandy loam, gently undulating
5	Brandon-Saffell association, moderately sloping 1/
6	Brandon-Saffell association, moderately steep 1/
7	Bruno loamy sand
8	Calhoun silt loam
9	Calloway silt loam, 0 to 1 percent slopes
10	Calloway silt loam, 1 to 3 percent slopes
11	Collins silt loam, occasionally flooded
12	Commerce very fine sandy loam
13	Commerce soils, frequently flooded 1/
14	Convent fine sandy loam
15	Dubbs fine sandy loam, 0 to 1 percent slopes
16	Dubbs fine sandy loam, gently undulating
17	Dubbs silt loam, 0 to 1 percent slopes
18	Dundee fine sandy loam
19	Dundee silt loam
20	Dundee-Bruno-Commerce complex
21	Falaya silt loam, occasionally flooded
22	Foley silt loam
23	Fountain silt loam
24	Grenada silt loam, 1 to 3 percent slopes
25	Henry silt loam
26	Hillemann silt loam
27	Jackport silty clay loam
28	Lafe silt loam
29	Loring silt loam, 1 to 3 percent slopes
30	Loring silt loam, 3 to 8 percent slopes
31	Loring silt loam, 8 to 12 percent slopes
32	Memphis silt loam, 12 to 40 percent slopes
33	Memphis soils, 8 to 40 percent slopes, gullied 1/
34	Mhoon fine sandy loam
35	Mhoon soils, frequently flooded 1/
36	Roellen silty clay loam
37	Sharkey clay
38	Sharkey soils, frequently flooded 1/
39	Tichnor silt loam
40	Udorthents 1/

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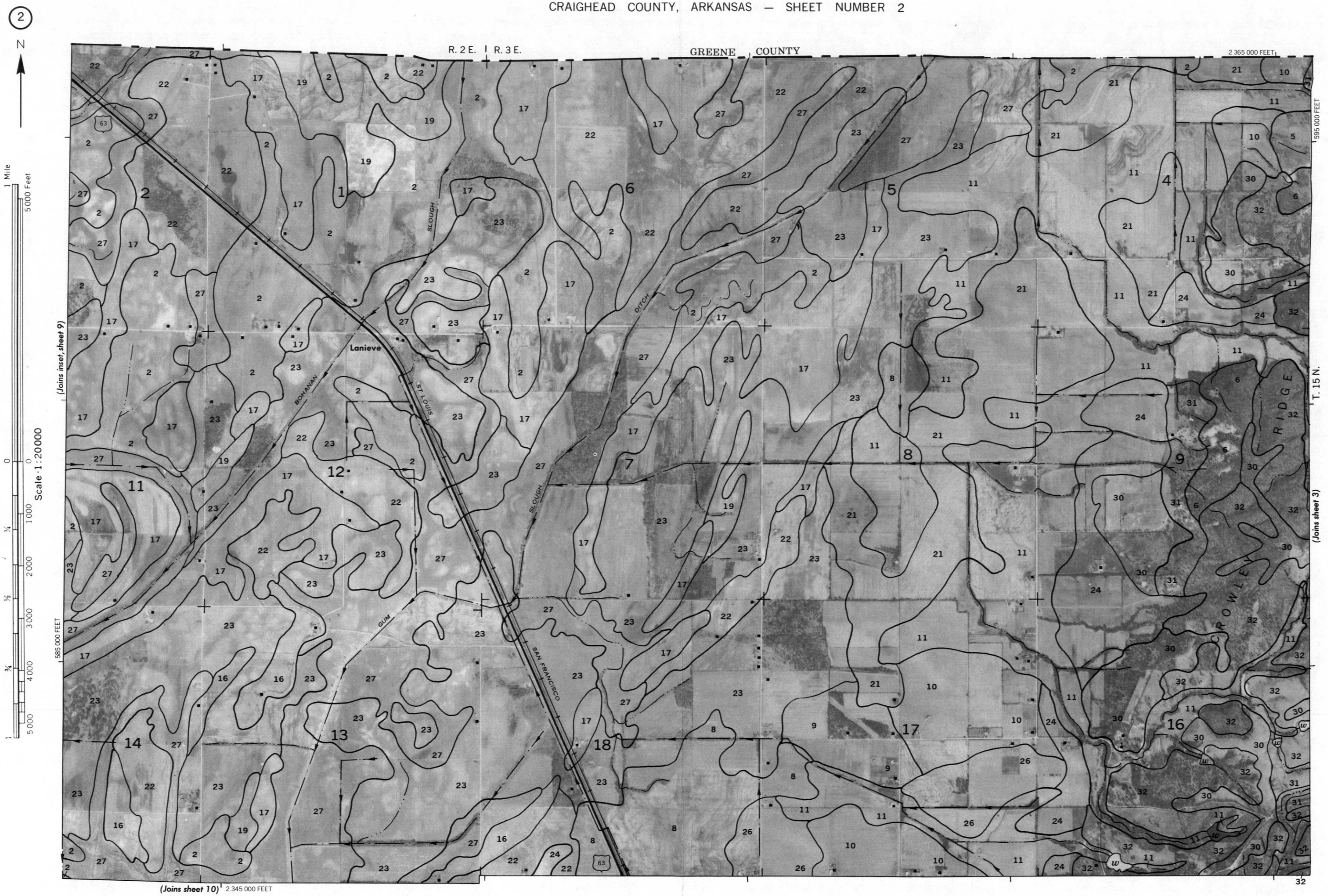
CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 2



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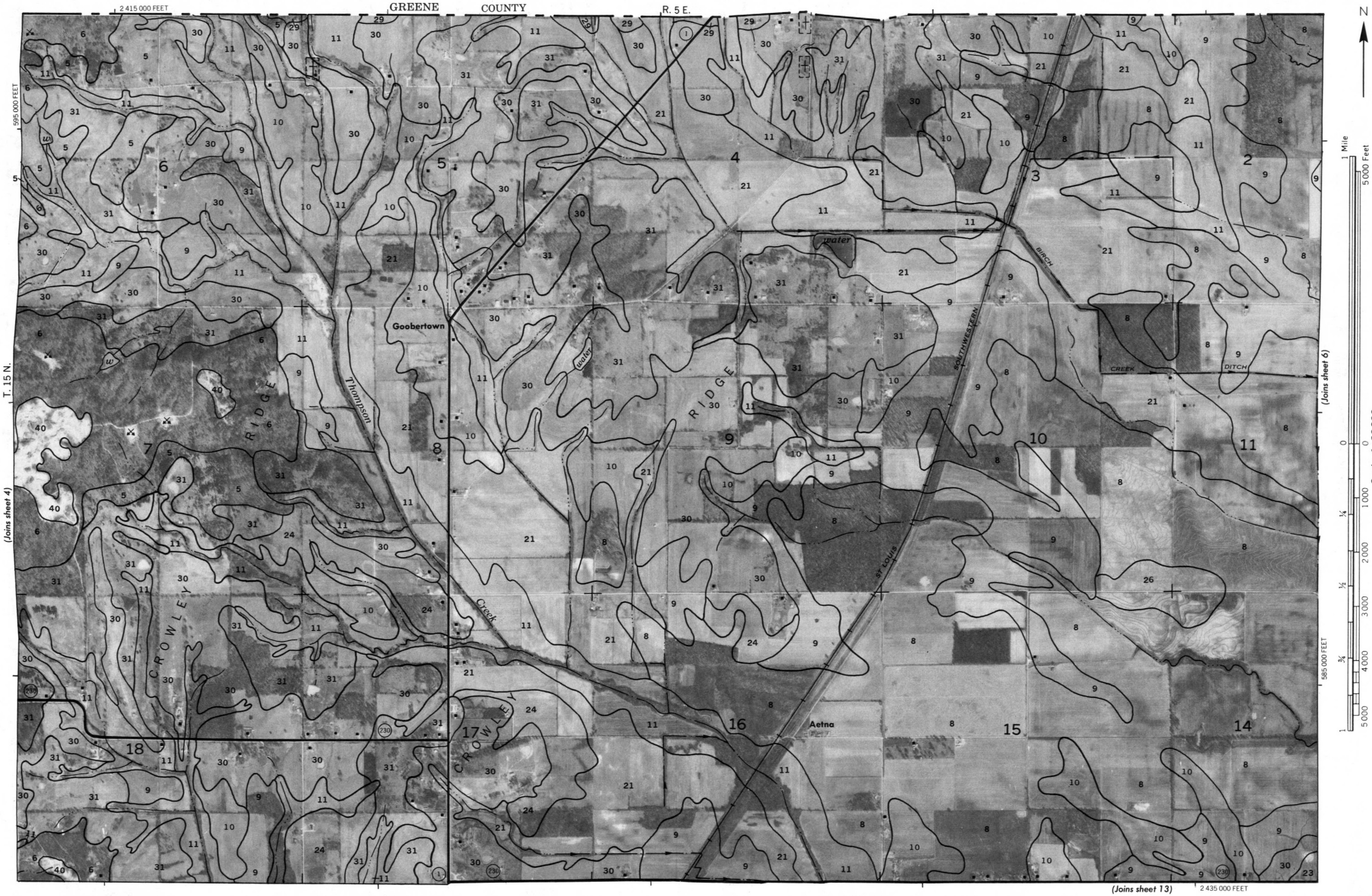

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CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 8

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CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 10

N

Scale 1:20000

1 Mile

5000 Feet

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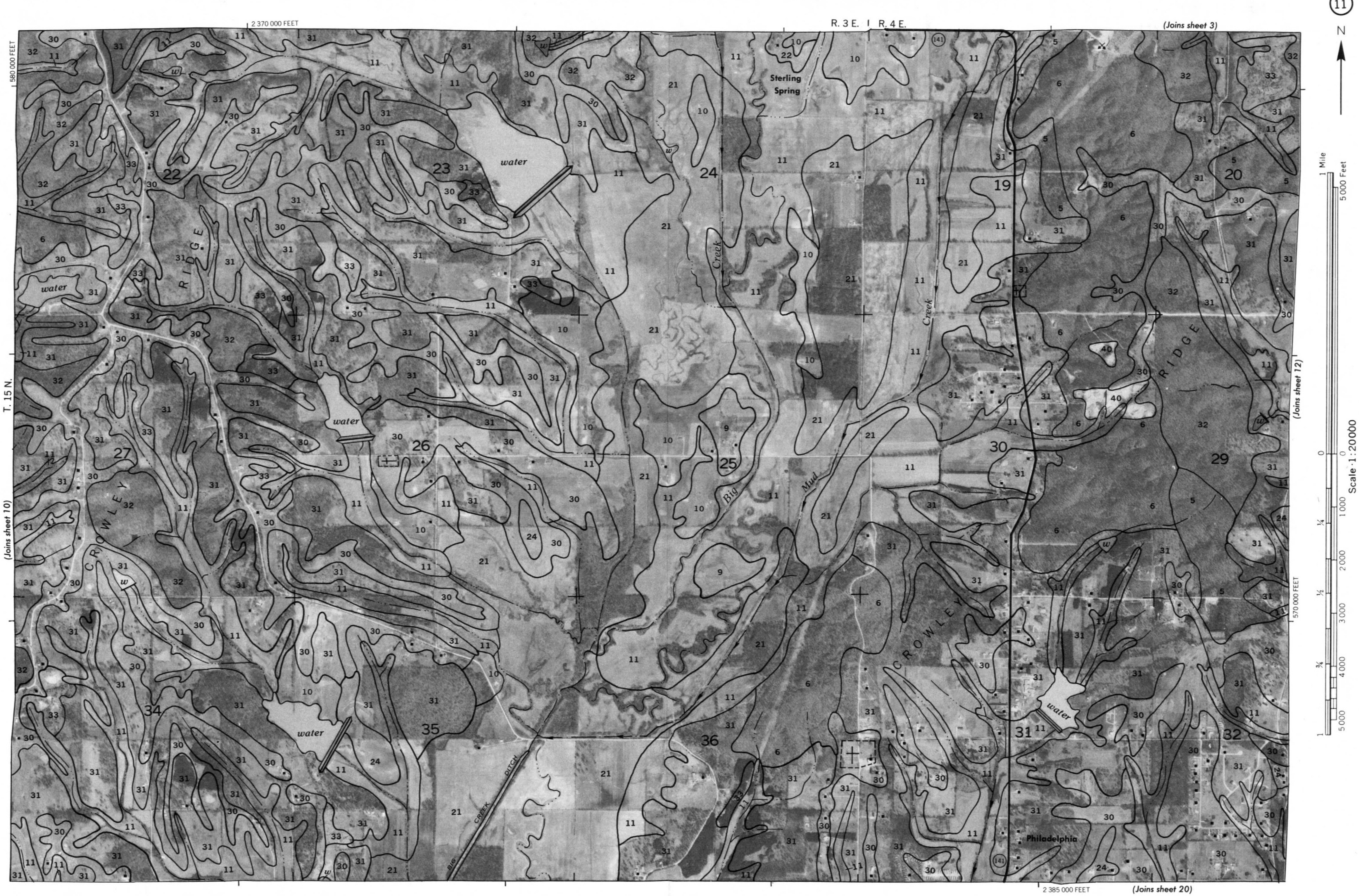
CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 11



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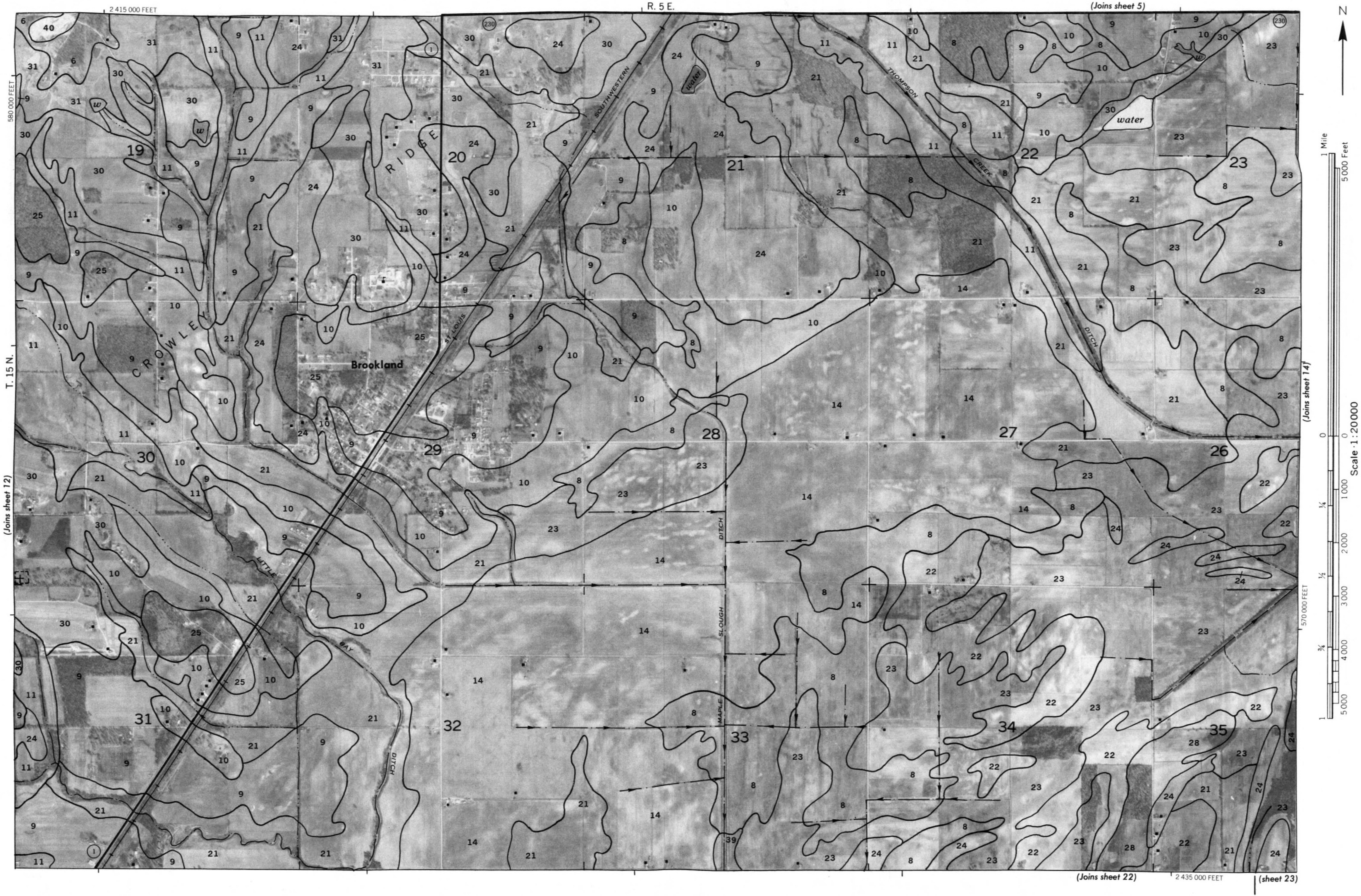

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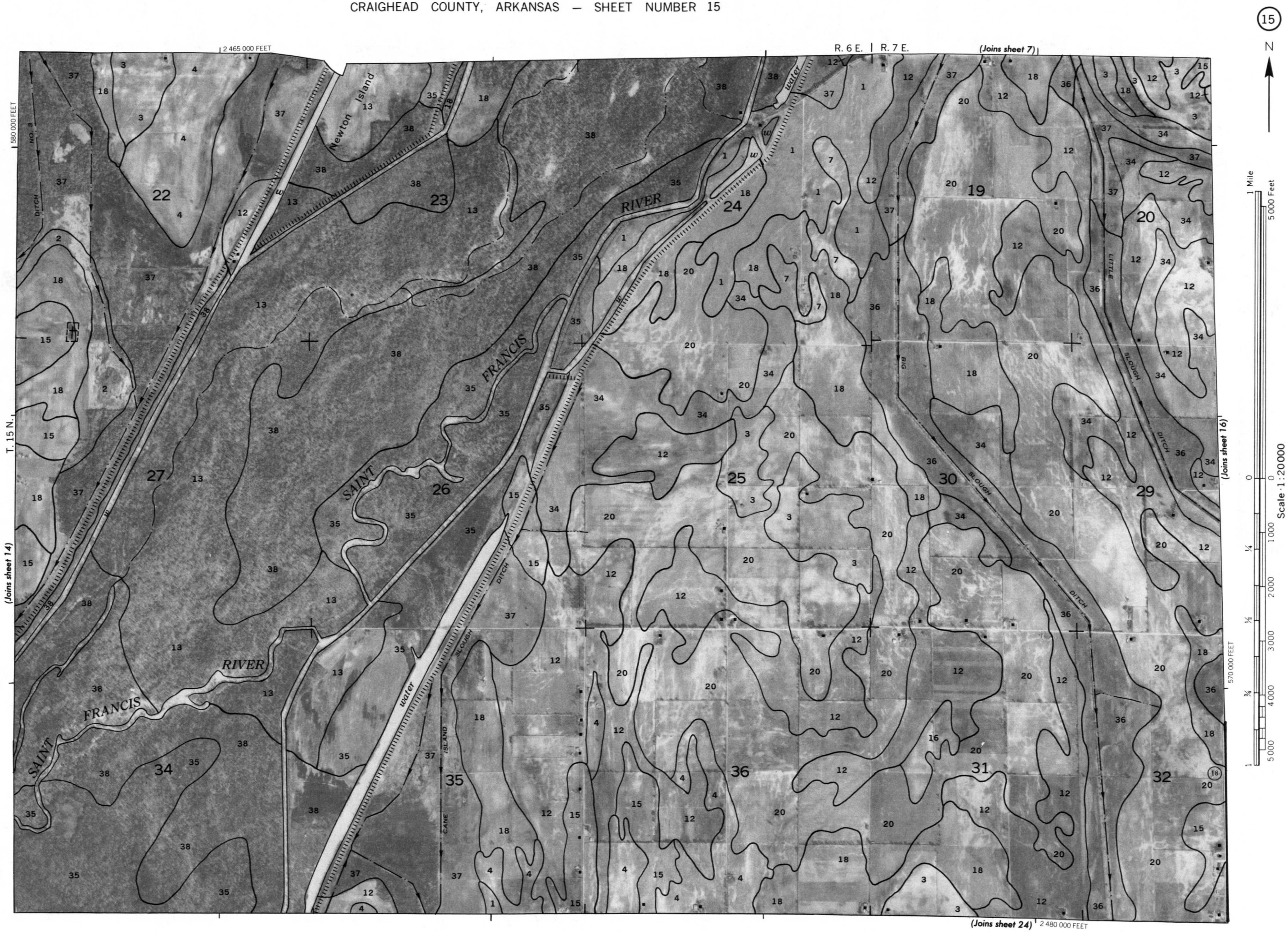
CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 15



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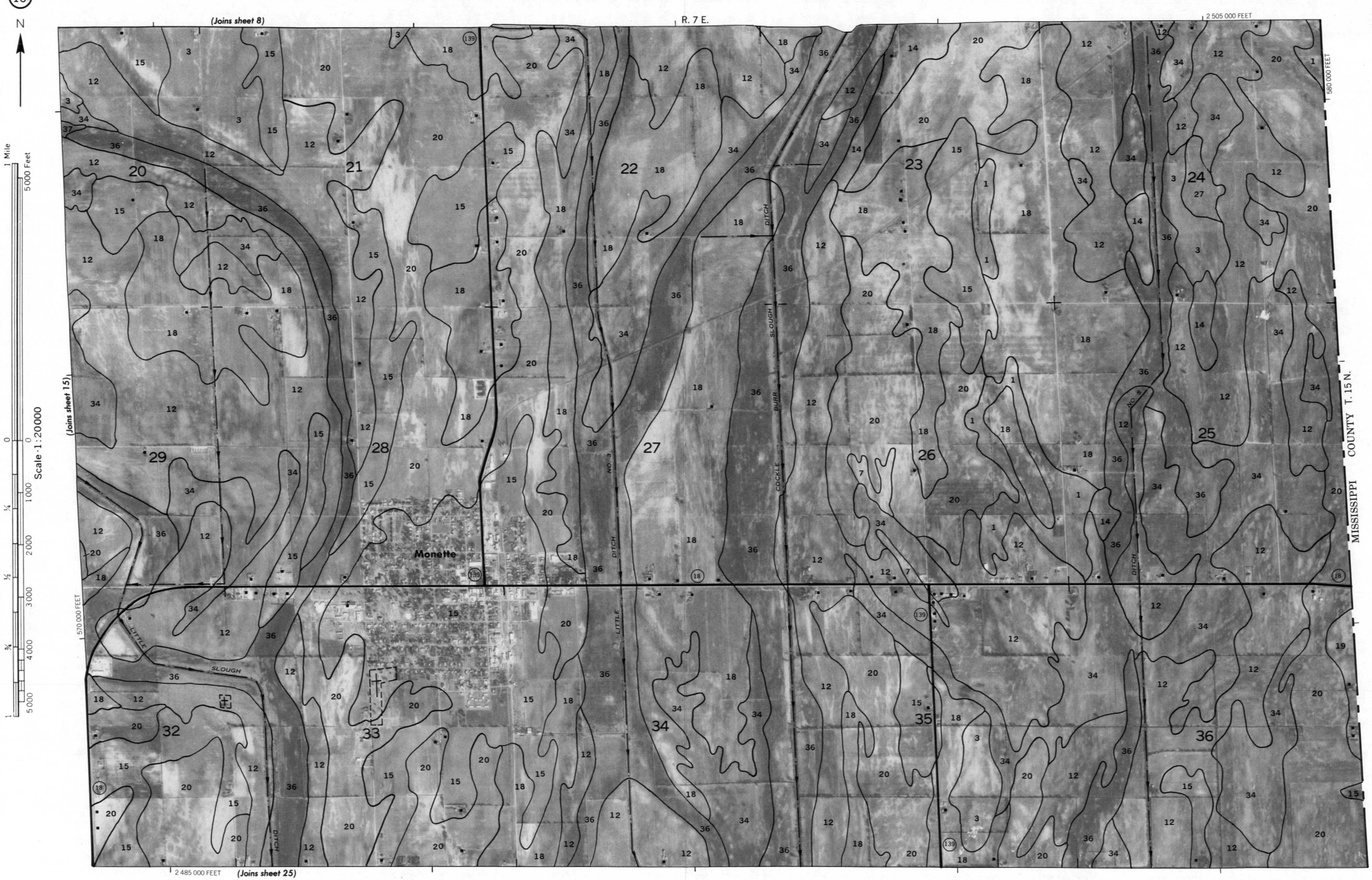

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CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 18

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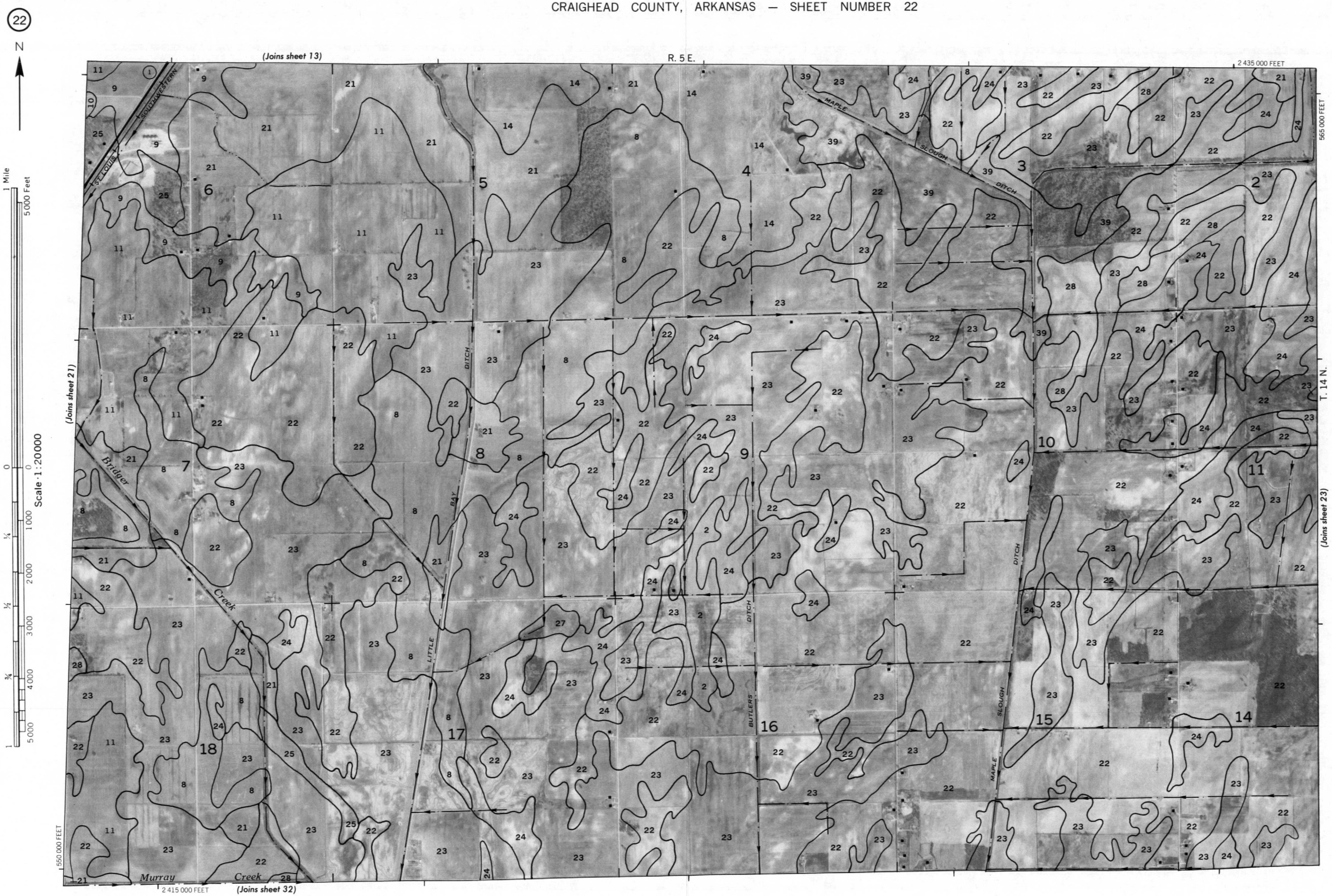

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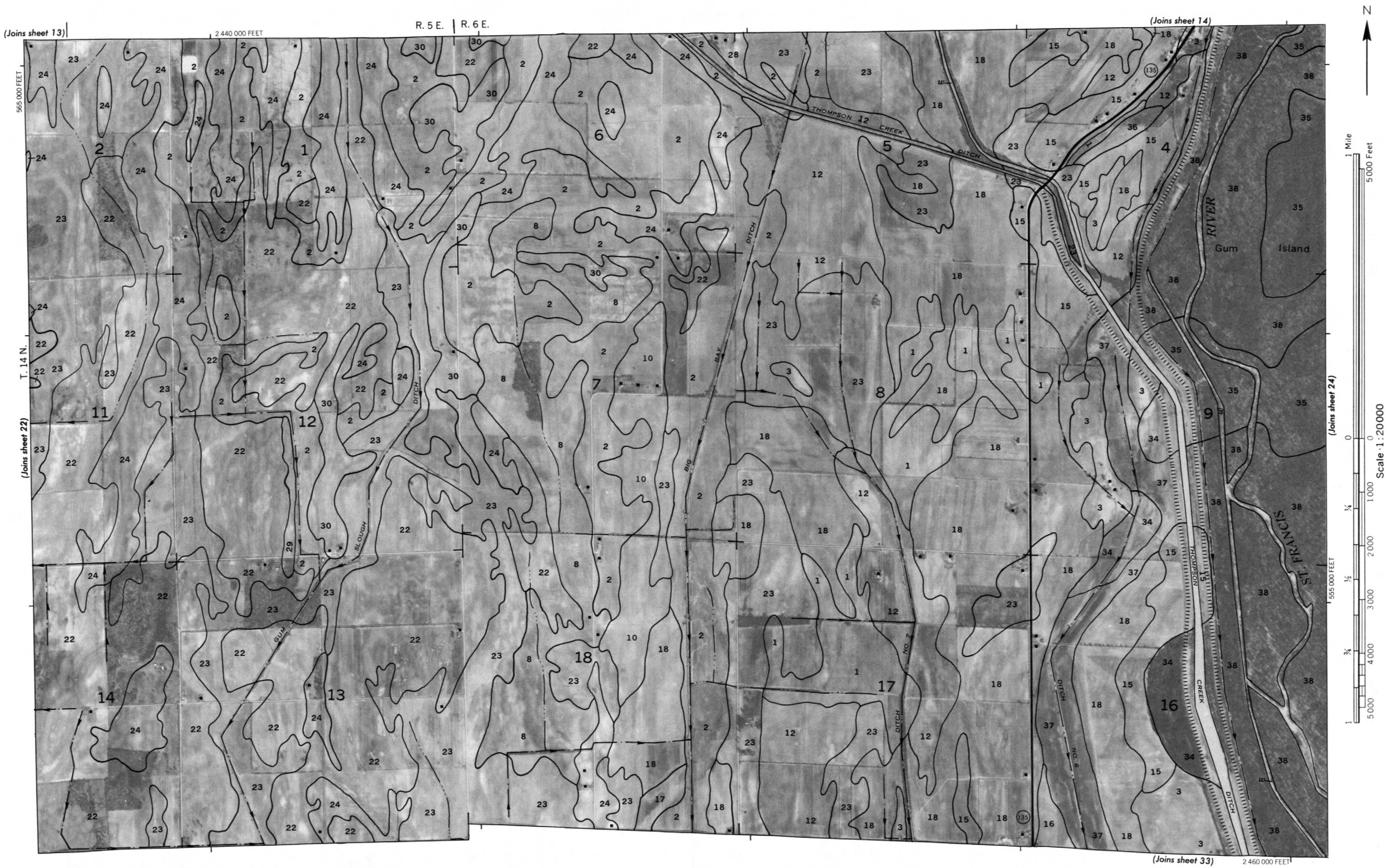

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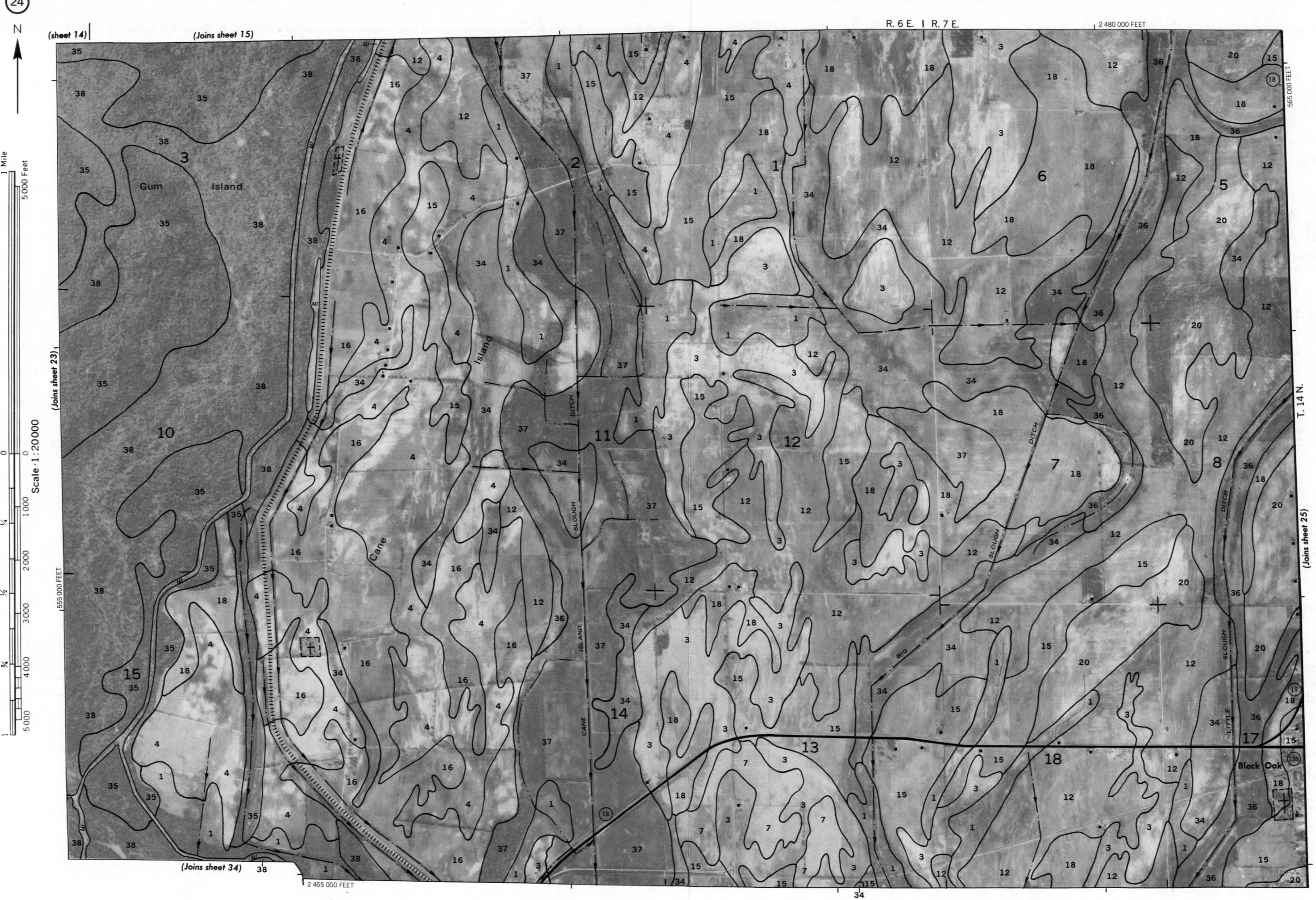

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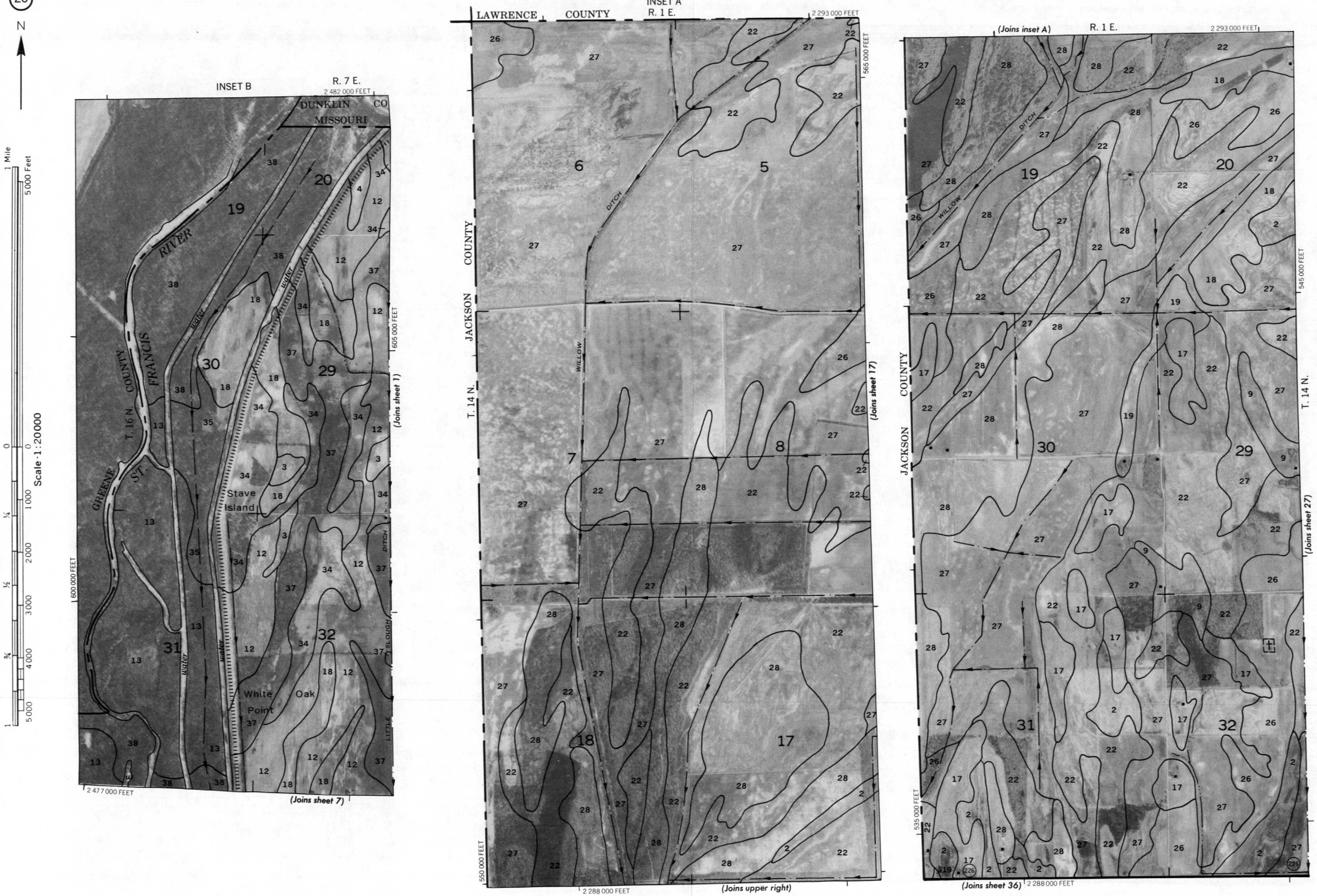
CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 26



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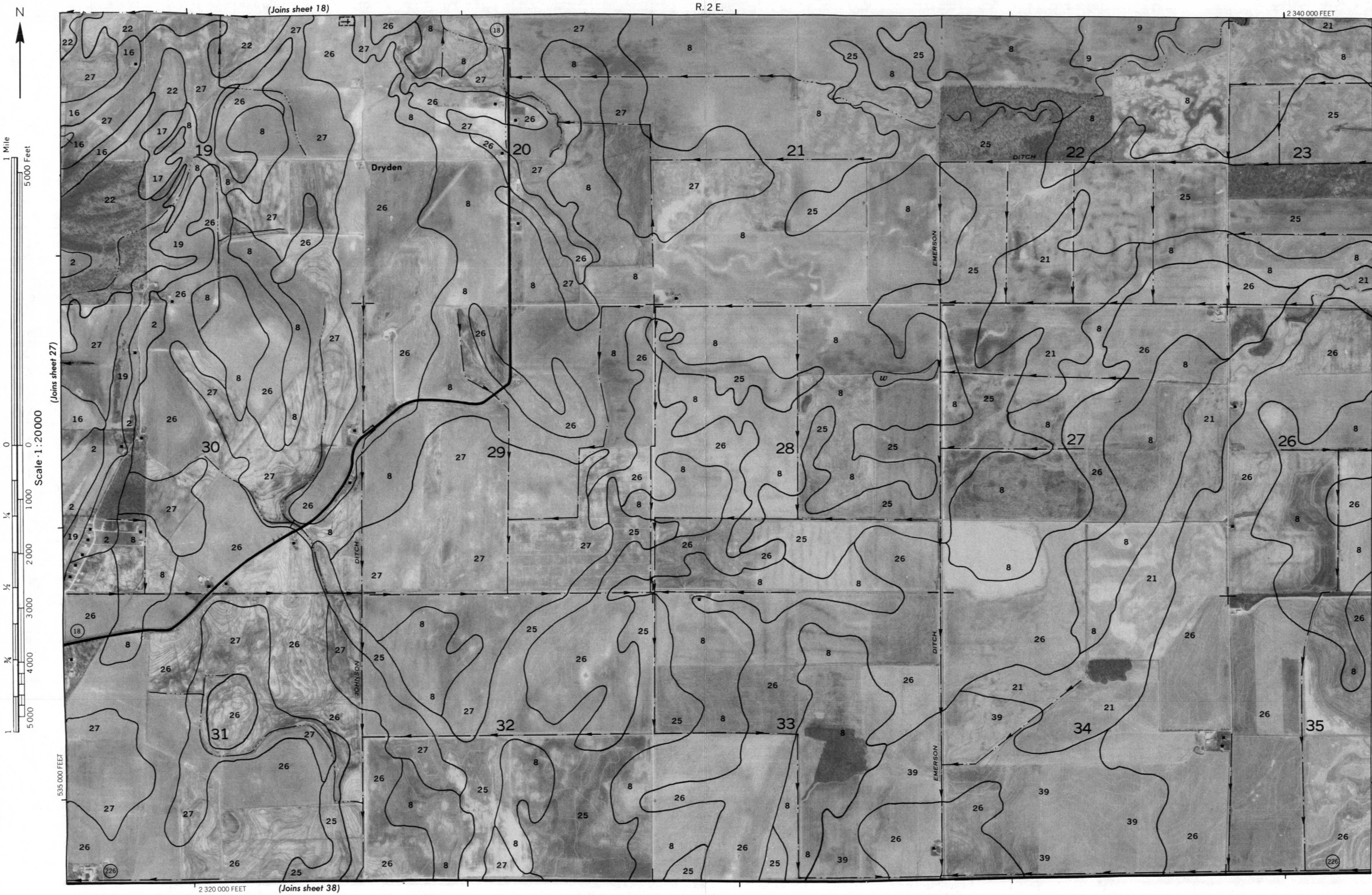

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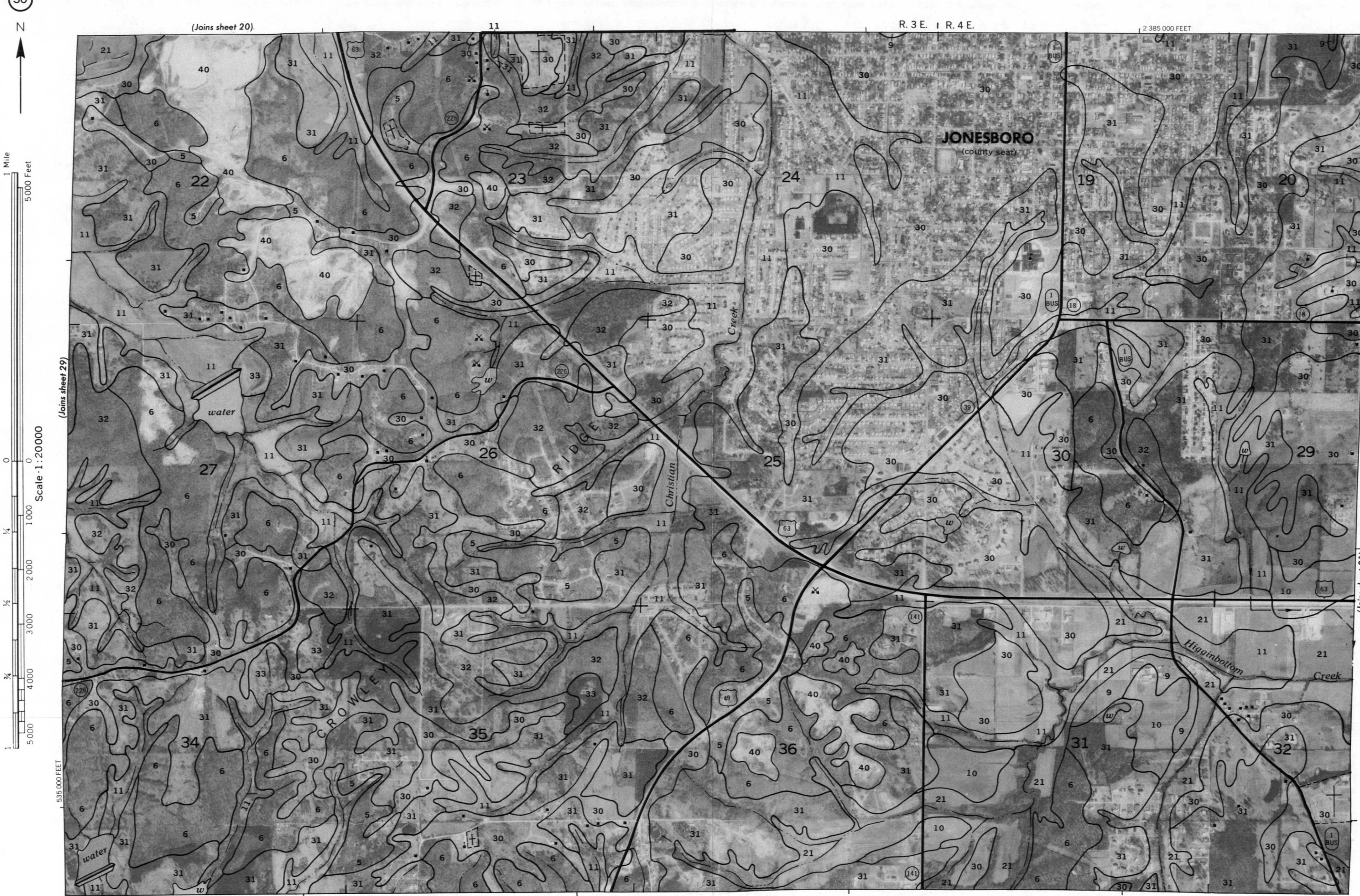

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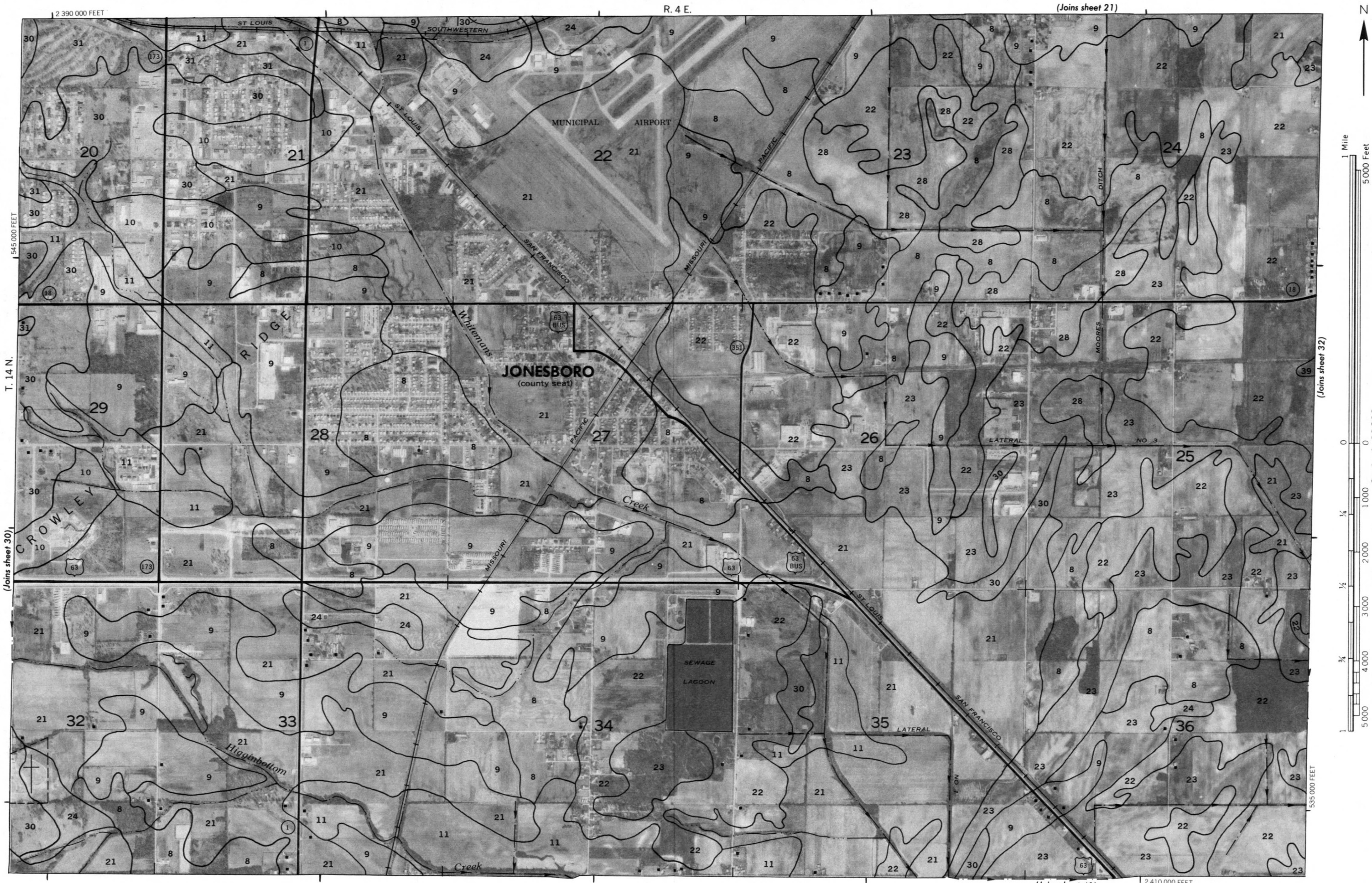

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CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 33

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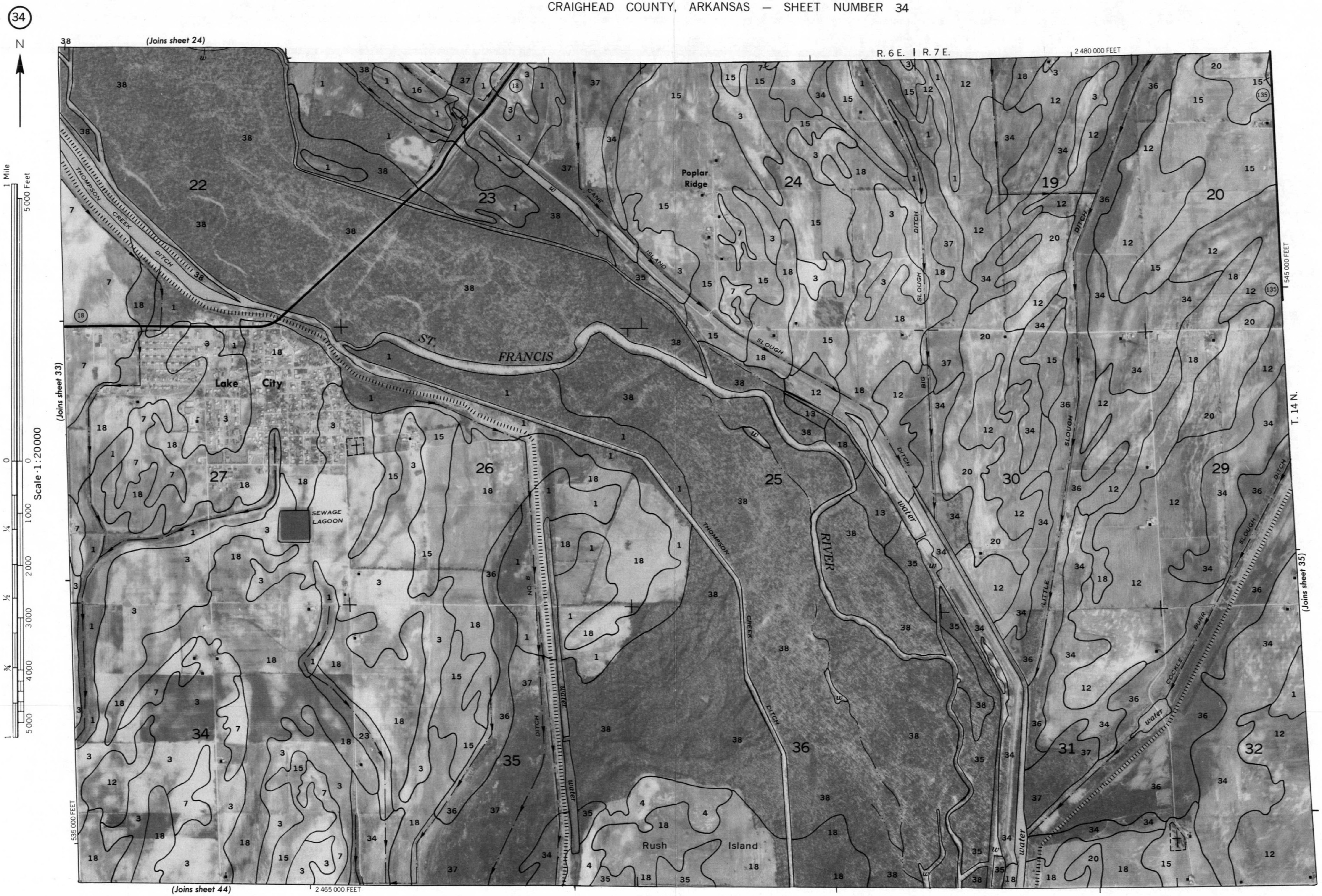

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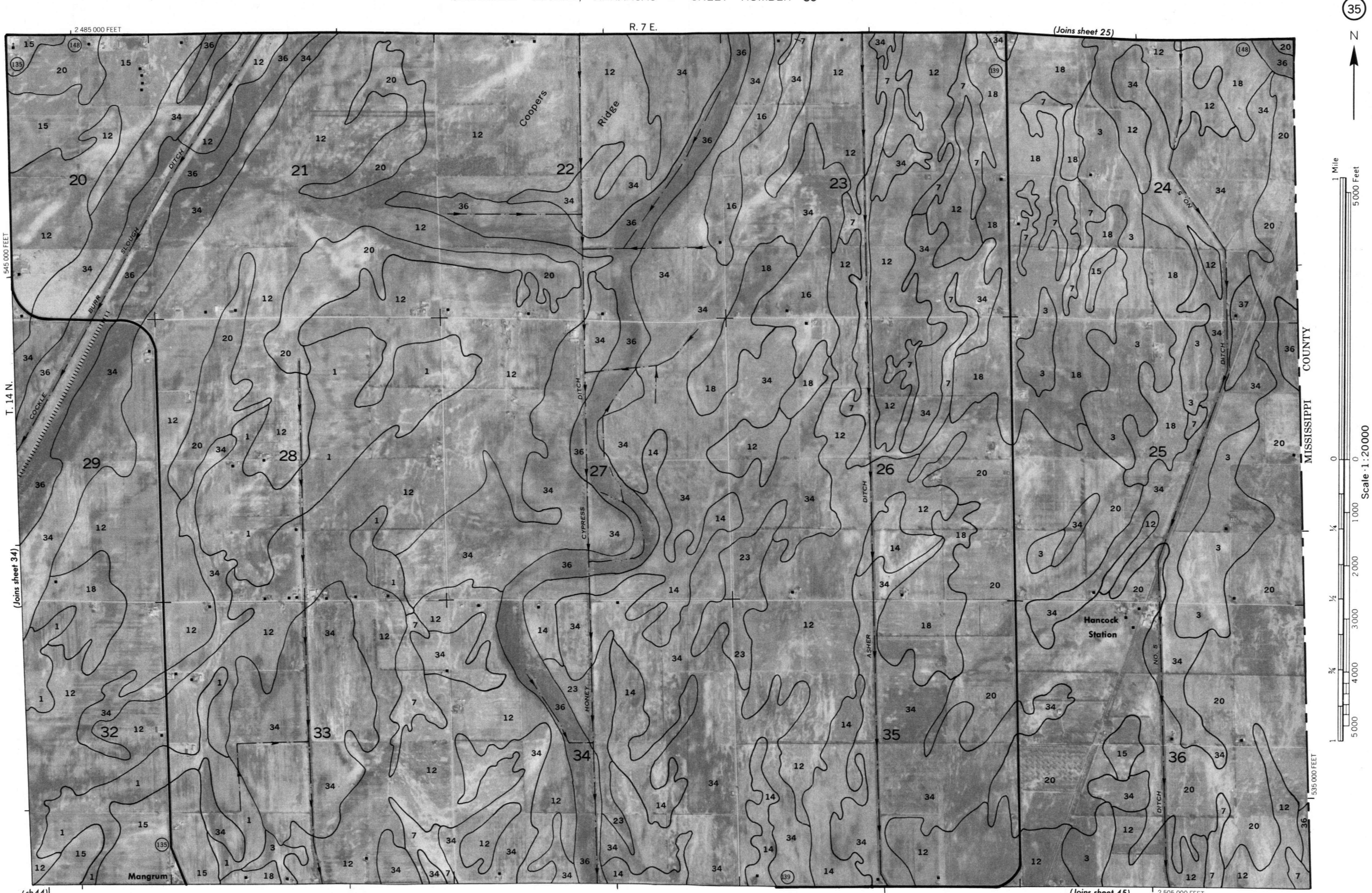

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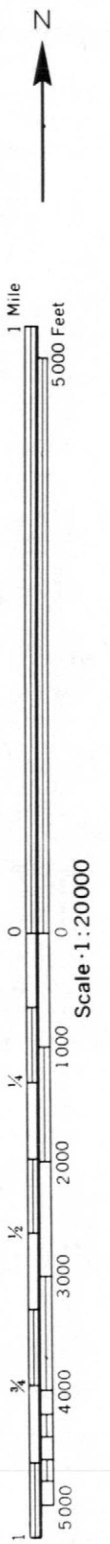

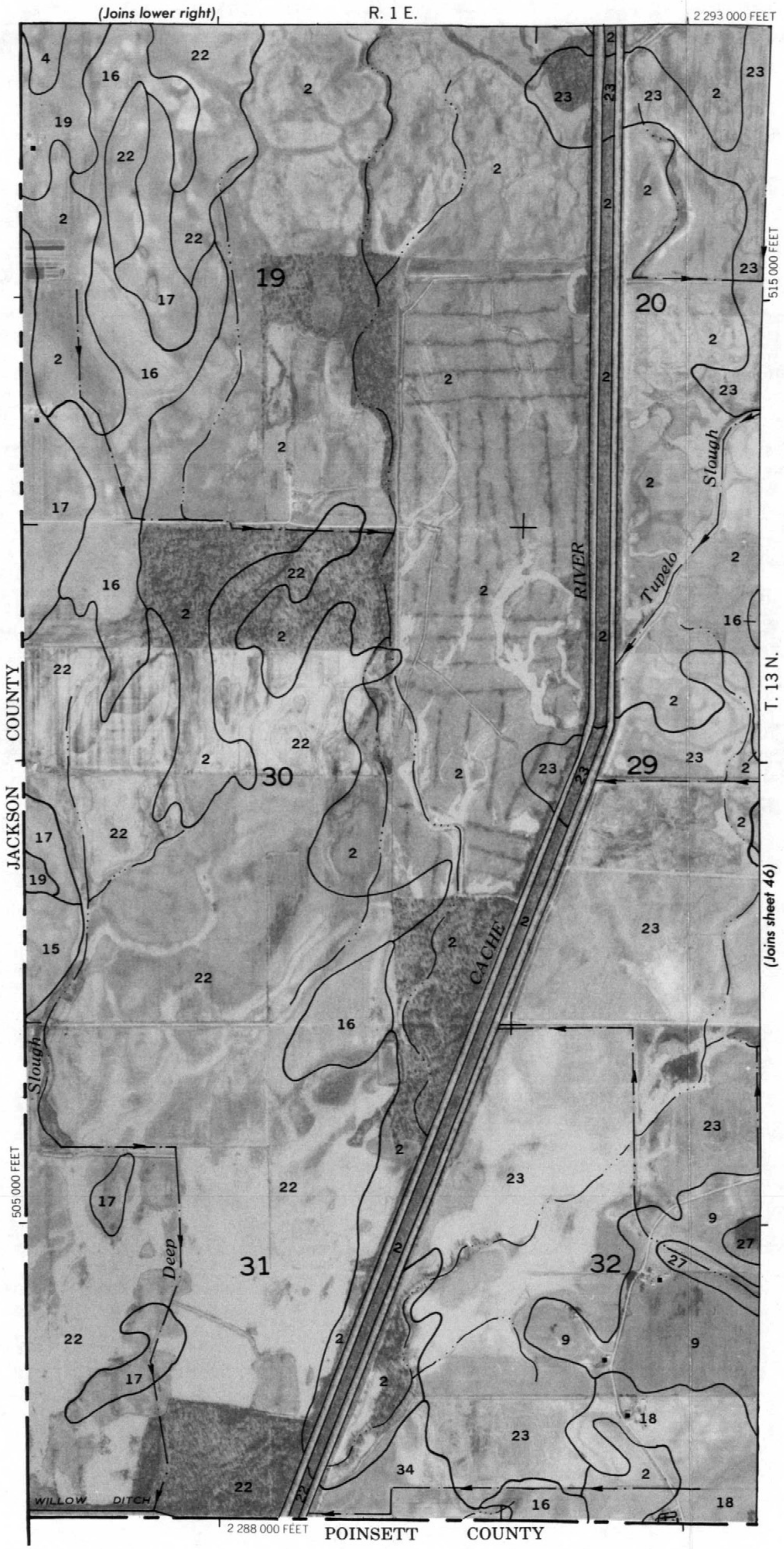

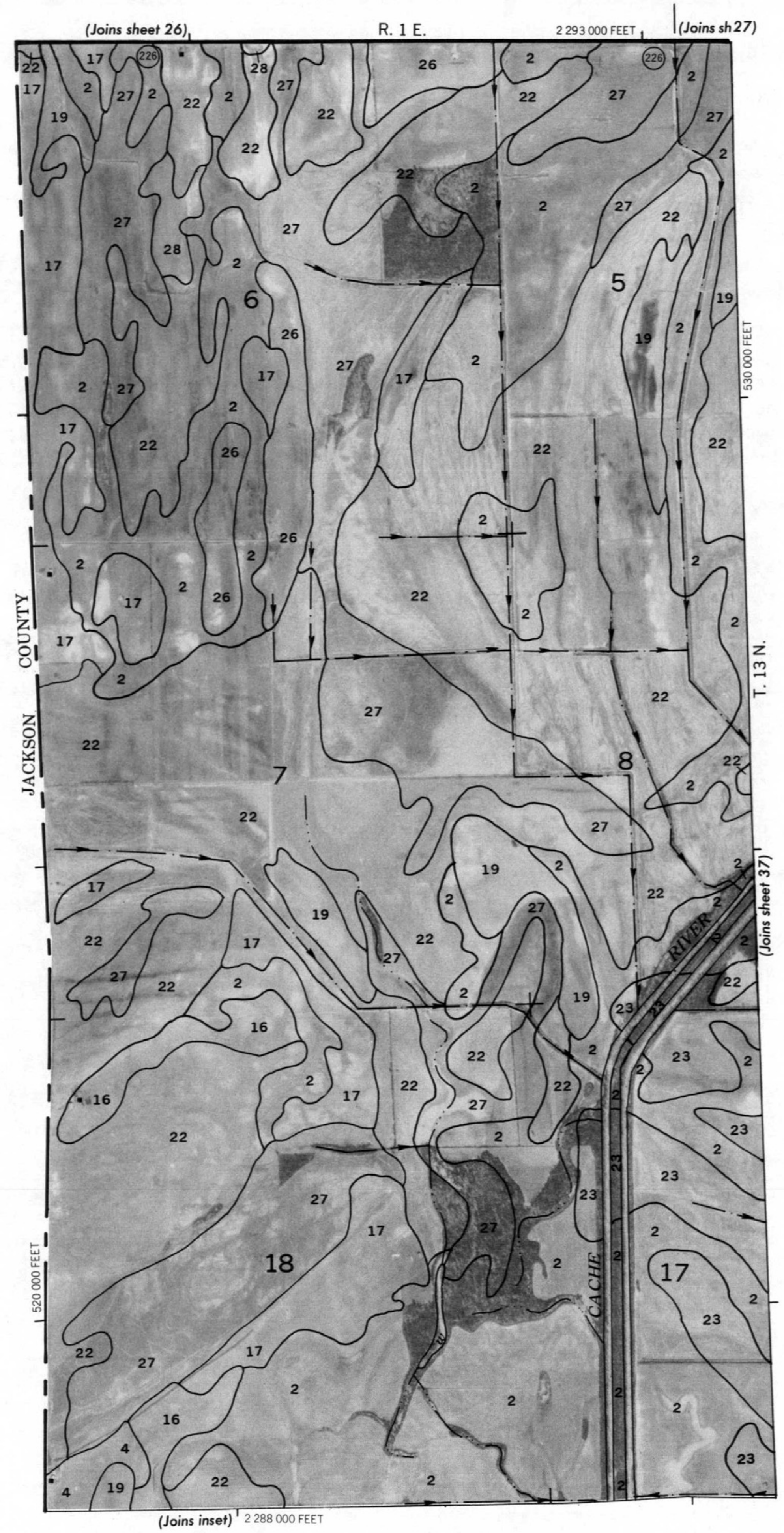

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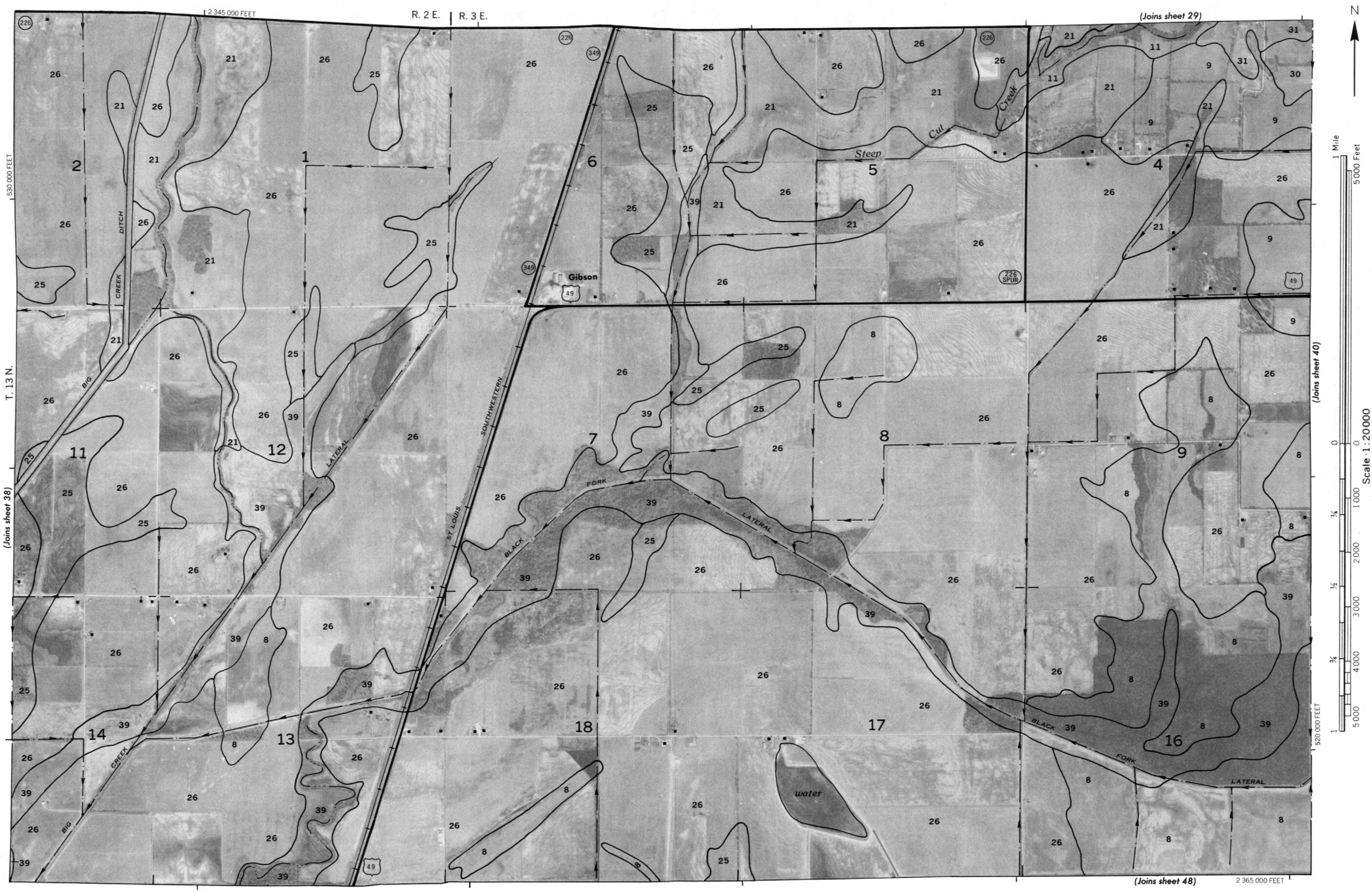

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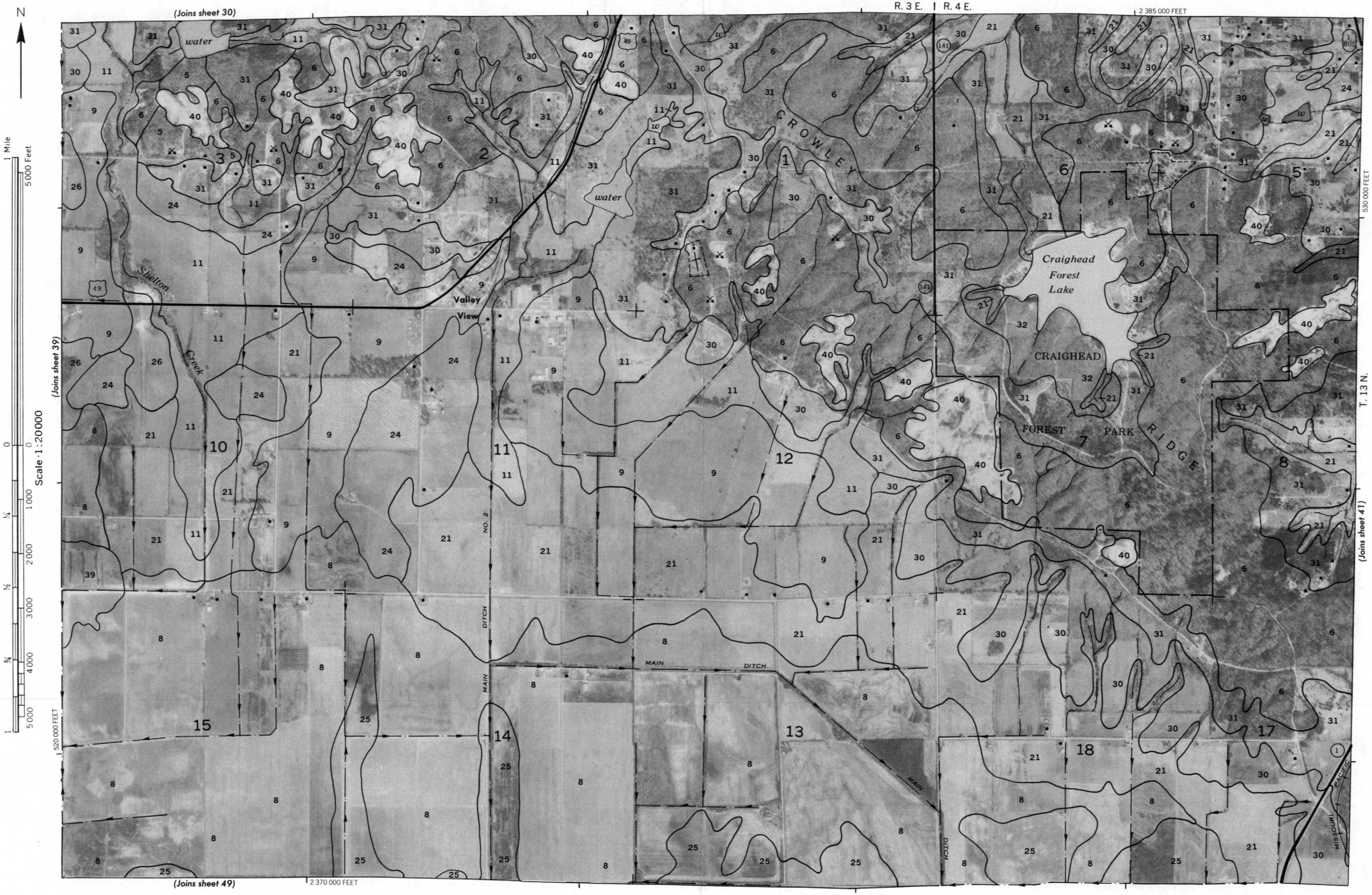

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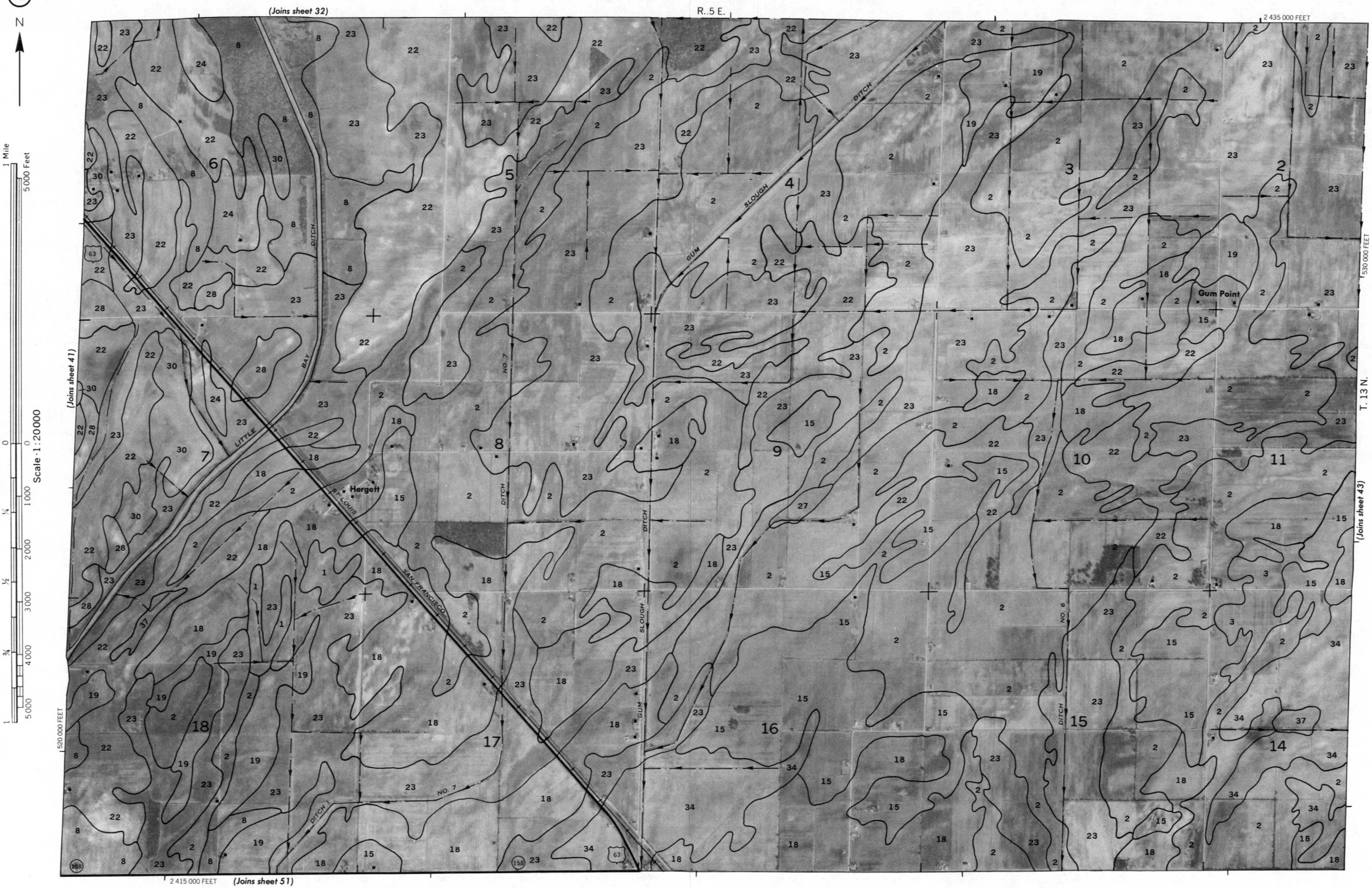

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CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 43

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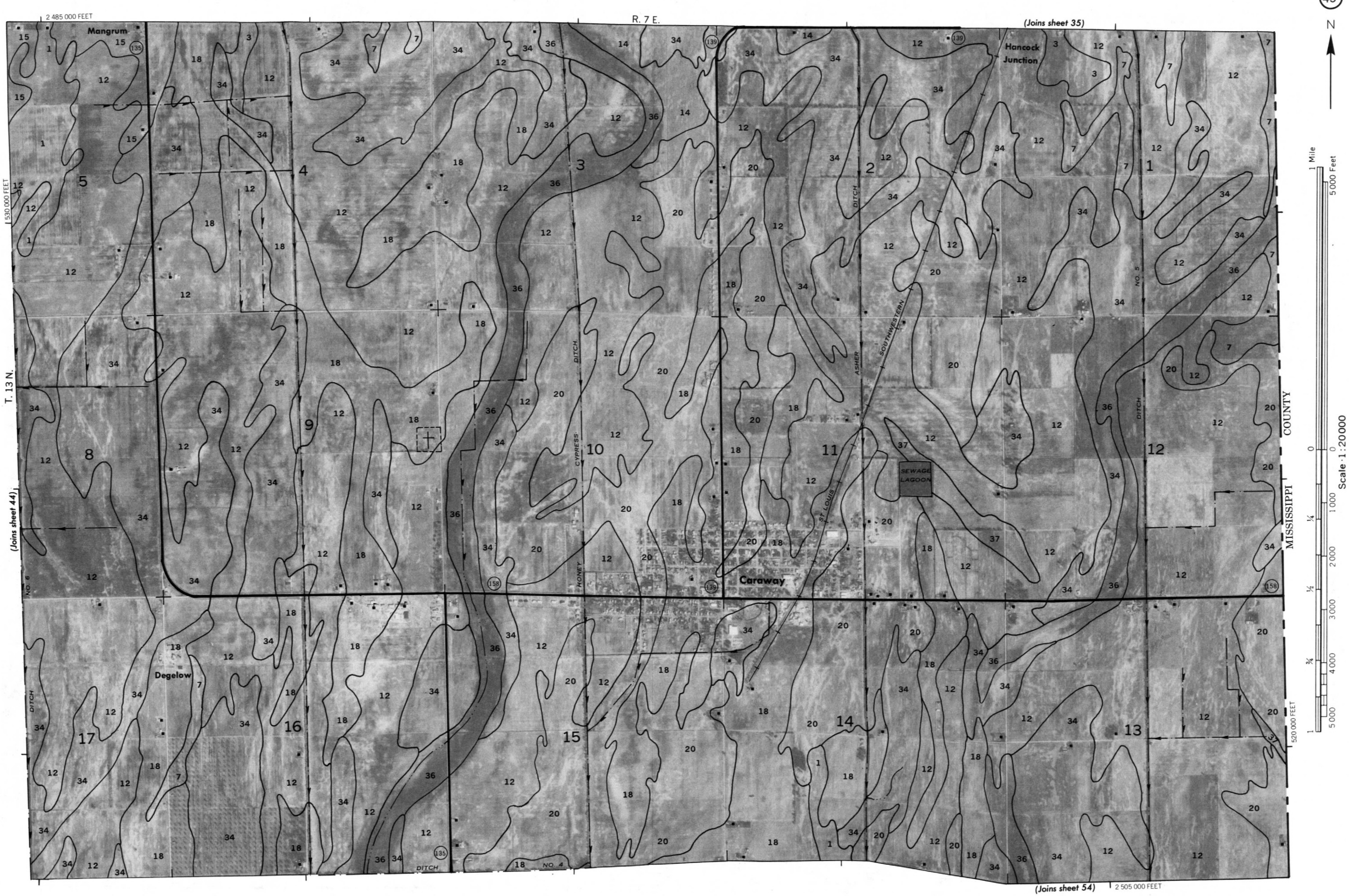

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46

N

1 Mile

5000 Feet

Scale 1:20000

0 ¼ ½ ¾ 1

0 1000 2000 3000 4000 5000

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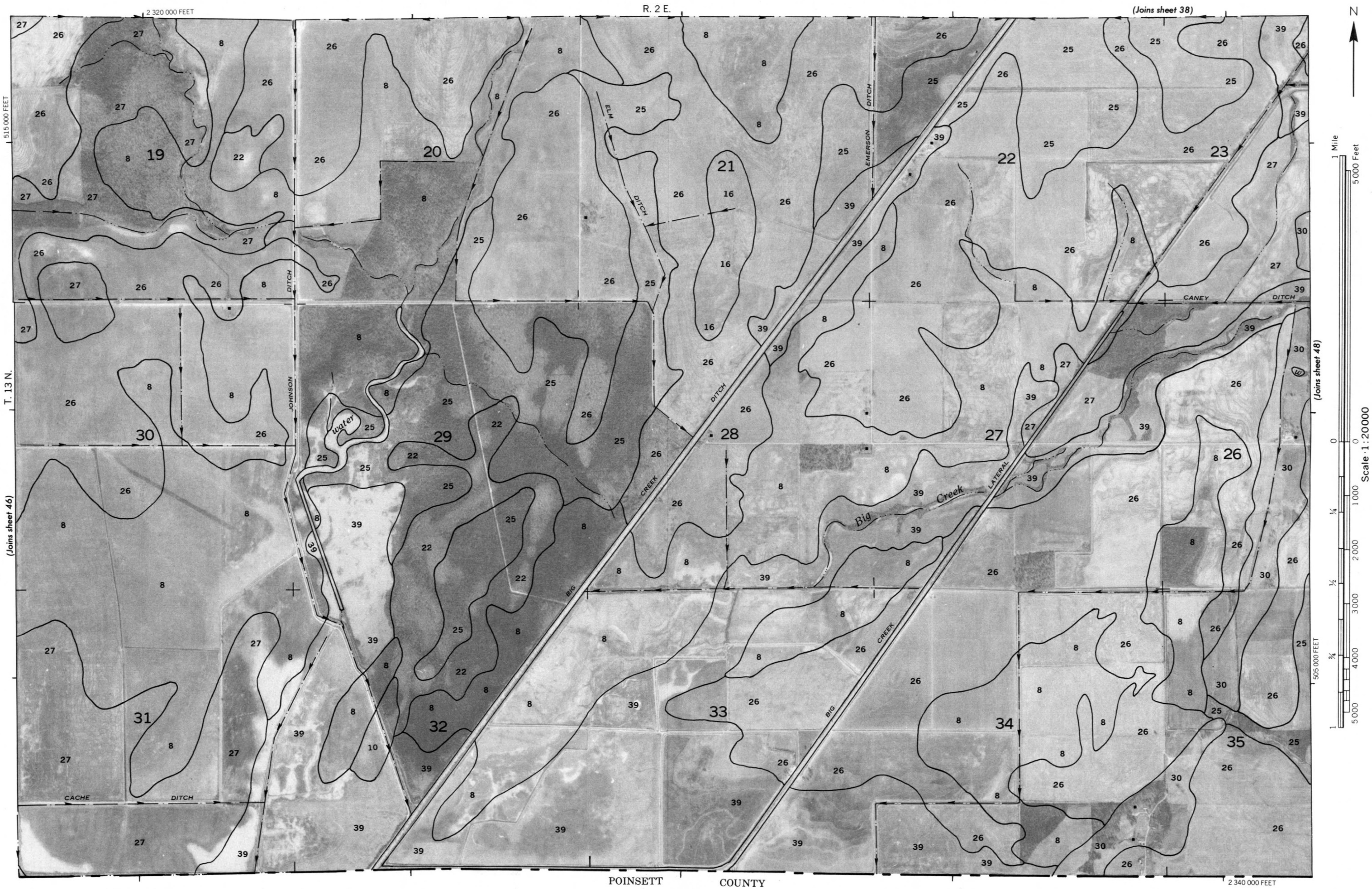

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CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 48

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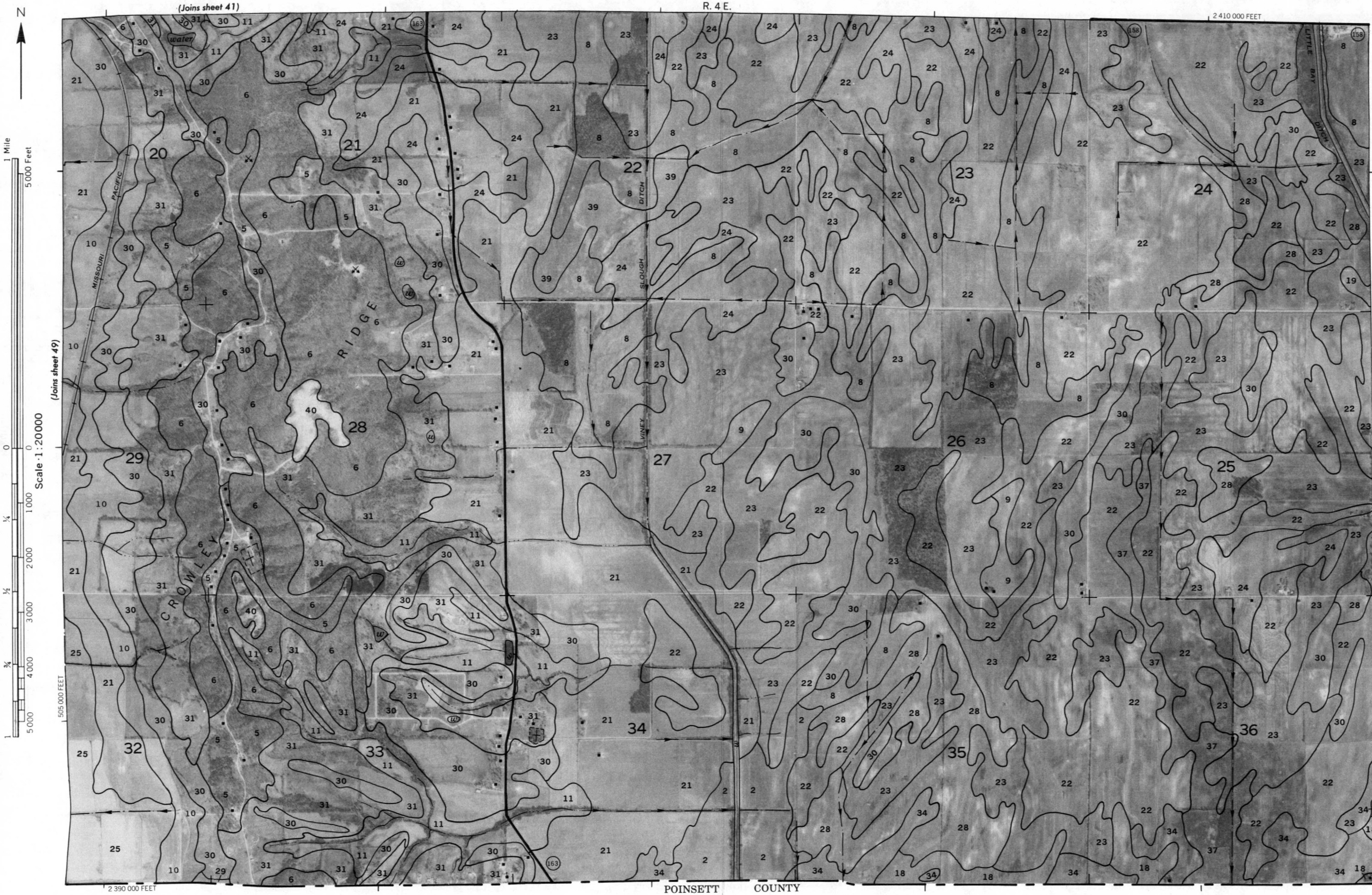
CRAIGHEAD COUNTY, ARKANSAS — SHEET NUMBER 50



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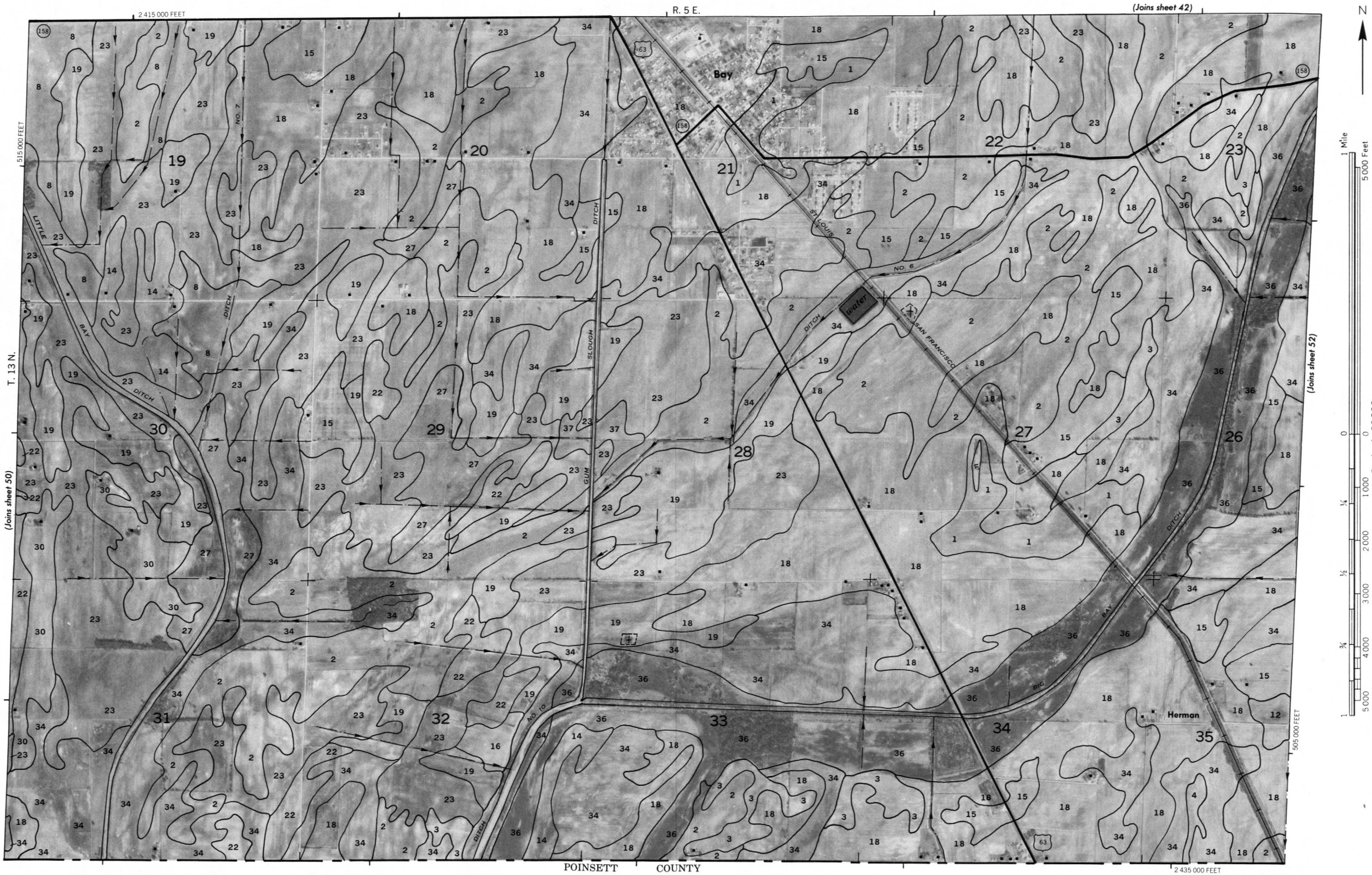

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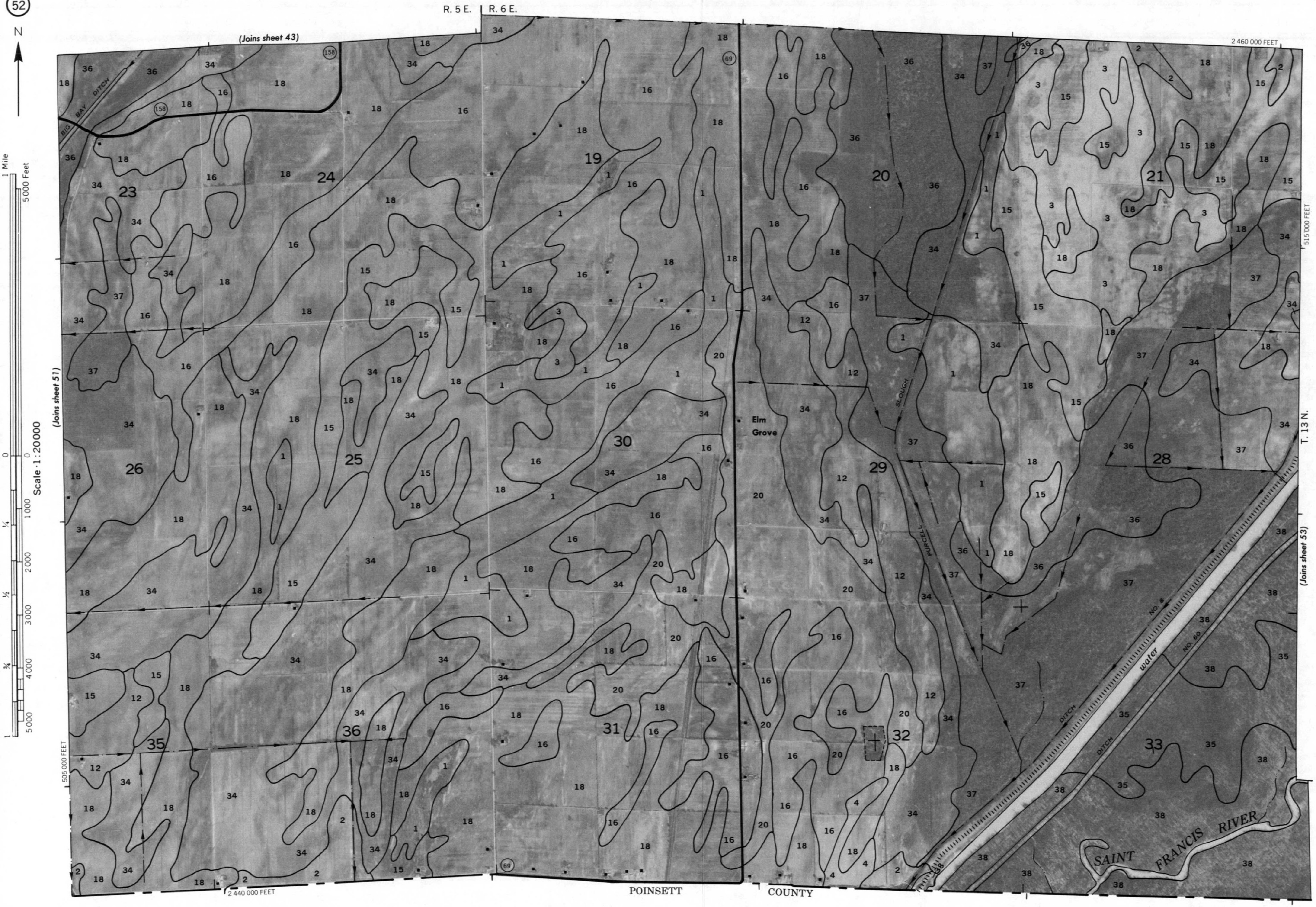

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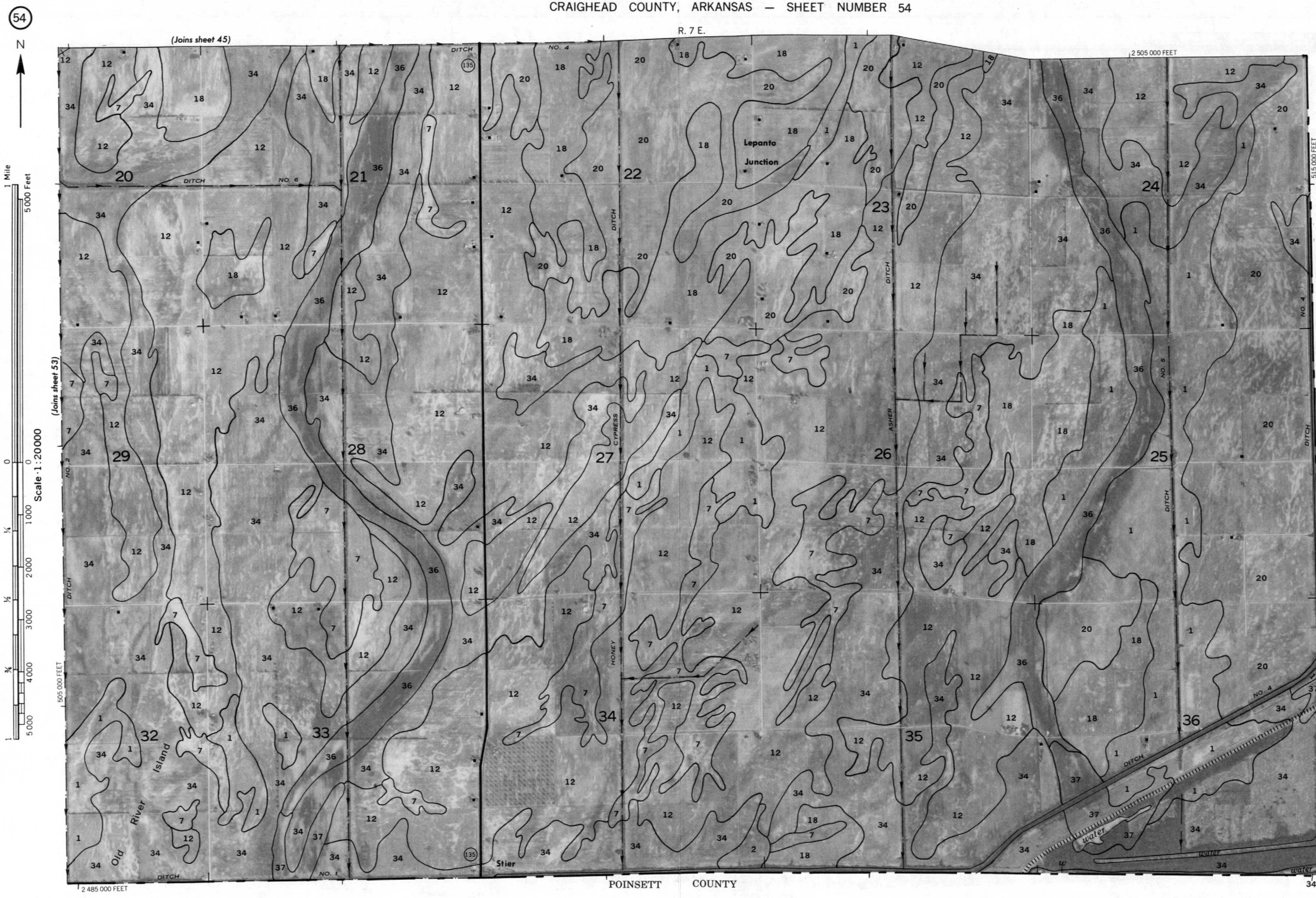

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